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Volume 10 October, 1946 Number 5

Talk About Land Prices!

Condensed from Capper's Farmer

Hadley Read

Iowa State College

"THERE never was a more glorious opportunity in the history of the world for the Corn Belt farmer than there is today. . . . I think any man is wise who has $8,000 to $10,000, if he can arrange to get terms or borrow money from his friends, to buy land at present prices. In my opinion, he cannot lose."

The "glorious opportunity"! Sounds familiar, doesn't it? Those words could have been spoken last Saturday night in any country town of a dozen different states. They could have referred to the present trend in Corn Belt land prices.

But they didn't. Those words weren't about present conditions at all. That ultra-optimistic outlook was presented by a machinery manufacturer in an Iowa newspaper back in 1919. The "opportunity" was the spiraling land boom following World War I.

That was the talk of 1919 and 1920 about land prices. It was gusty, confident talk — big talk about the wonderful future and about how land prices and farm prices were up to stay. It was boom talk.

But it was only a little more than 10 years later that Midwest farmers saw what 10-cent corn and 3-cent hogs could do to boom talk. The road from boom to bust had been short, and it had been painful. Life-time earnings were lost because too many listened and wanted to believe. It was tough, but there were those who said a lesson had been learned. Farmers would not be caught again.

But did we learn? Listen to the talk now. This is 1946. An editorial of recent issue reads:

" . . . another farm just outside the city sold a year ago for $250. We would not call these prices inflationary, and at the prices now being paid for farms in

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northern Iowa, the land is the best investment by far of anything to be had. Even after the war prices for farm products dwindle a little later, the farm will pay good dividends one year after another on Iowa land at even higher prices than those mentioned here. We advise, buy all the land you can pay for and you will be sitting pretty later."

That's today's talk — just as gusty and confident. We seem to be refusing to believe it can happen again.

It is happening again. It's happening every day and every month. The black line on the land price chart continues to edge upward and upward. It is being pushed by pressure from returning veterans who want to farm, from speculators who seek a quick profit from long-time farm operators who want to protect themselves against not having a farm to rent.

Long lists of figures aren't needed to tell the story of the land boom. Any farmer, regardless of the state, can point to places that sold recently for half again to double what they sold for before the war. Likely a few have been sold 2 or 3 times during the last 6 years.

But for those who want the cold, black figures, here they are: For the whole country, land prices have gone up 67 per cent since 1941 when the war started. In March, this year, they were 71 per cent above the March average for the 1935-39 period.

By states the situation is even more serious. For instance, Indiana acre values were up 111 per cent from 1935-39; Colorado, 114 per cent; Ohio, 93; Michigan, 90; Illinois, 81; Missouri, 73; Oklahoma, 71; Iowa, 67; Texas and Kansas, 58; Minnesota, 51; Nebraska, 37; South Dakota, 31; and North Dakota, 29 per cent.

Perhaps those figures are nothing to be afraid of. Some don't think so. Listen to more of the 1946 talk about land prices. It's the same kind heard in 1919.

Recently another Midwest paper editorialized:

"Land prices have gone up a lot in the last few years, but have not gone crazy like they did after the war before this one. And . . . good land is certainly worth the prices which have been paid for it."

That talk says prices are not as high as they were after the last war. Maybe not, but the facts tell a different story. Here they are:

The increase in land prices during the 12 months from March, 1945, until last March, with the exception of two years, was the biggest jump in land prices during the last 35 years. One of those exceptions was 1919-20. The other was 1943-44.

Land prices have not gone

crazy? What about values last March, 71 per cent above the 1935-39 pre-war level? For the entire country during the last war, land prices increased only 70 per cent from the 1912-14 period to the 1919-20 boom peak. In 26 states in 5 different areas, land prices have gone up more during this war than they did during the last.

But this present dangerous situation has not ended. After World War I the boom peak was reached in 1919-20. We've reached that level of increase now, and unless farmers apply their own buying and speculating brakes the boom may be even higher and the bust harder than before.

All the blame can't be placed on the speculator, but the higher land prices go the more speculation speeds the climb. Surveys in selected counties over the country show that one seventh of the farms sold last year were resales of land that had been held less than 2 years. And about a third of the resales involved farms that had been held less than 6 months.

Adding to the speculative danger is the continuing high prices farmers are receiving for their products since the war ended. Now, serious shortages of food abroad and of feed here at home, point to heavy demand for farm products at least for the remainder of the year and into the next.

With the continuing demand for food and farm products will come the ever-increasing pressure on land prices. There is danger that the talk will grow louder. There's something contagious and intoxicating about high prices, especially land prices.

It's easy to forget that even with a big down payment on a farm at today's prices, the remaining mortgage often is more than the total value of the farm before the war. And farms with that kind of a mortgage aren't paid for in a year or two of even good prices. Land buying is a long-time proposition, and any farmer who thinks about it will agree.

It's not thinking about it that hurts. The danger lies in believing the talk — the kind of talk that in 1919 came from a reputable Midwest banker in a statement to his newspaper:

" . . . I do not consider that there is any particular boom on land. . . . It will never be worth less and the tendency will be for higher prices from now on, as land is the safest investment in the world."

Flavors in Milk

Condensed from Guernsey Breeders' Journal

Jack Bailey

ACCORDING to Weaver of Oklahoma A. & M. College, the most important flavor defect in milk is that of feed. Incriminated feeds include various ensilages and early pastures, rape, wild onions, cabbage, and so on.

The experts stress the fact that feed flavor is largely imparted to the milk through the body of the cow. Absorption of odors by milk doesn't seem very important, but the confinement of cows in smelly, poorly ventilated stables may be another story.

Yaxis of Cornell University put milk in open containers, set them in the silo, and left them overnight. There was no recognizable absorption of silage odor by the milk. The same worker separated milk behind the kitchen stove while bacon and eggs were being fried. Result—no effect on either skim-milk or cream. Tests on inhalation of odors by cows was a horse of a different color.

Babcock found a strong garlic odor and flavor in milk drawn two minutes after the cow had inhaled garlic for 10 minutes. Peterson and Brereton showed similar, but less striking results with other substances. What to do about this feed flavor business?

Fortunately there is a way of getting around the problem. The whole thing hinges on the time of feeding. It is generally agreed that feed flavor is no longer evident in the milk five hours after the feed has been eaten. It is as generally agreed that the flavor is discernible an hour less after feeding, depending on the feed. After two hours, it gradually disappears, none being evident after the fifth hour.

Accordingly, if the flavor is due to silage or barn feeds, it is advisable to feed after milking. In the light of the work on flavors by inhalation of odors, it would also seem important that the cows be kept in an atmosphere free from undesirable odors before milking.

If the flavor is due to pasture weeds or feeds, it would seem best to bring the cows off the offending pastures five hours before milking. They might be

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turned into an innocent pasture or fed dry feeds. If five hours is impractical, they should be brought in at least two hours before milking. Not all of the flavor will have disappeared, but at least it will be reduced to some extent.

That brings us to the defect second in importance on Dr. Weaver's list. That is the "cowy" flavor. Normally, all freshly drawn milk from healthy cows has a mild, pleasantly "cowy" odor that disappears with proper care and cooling. When the milk is improperly handled, the mild "cowy" flavor becomes stronger and stronger. The milk progressively acquires variations of "old" and "stale" flavors, finally becoming rancid, with the typical disagreeable odor of the butyric acid. And just how does all this come about?

First, the chemists tell us that all milk contains an enzyme capable of breaking down and decomposing fat. This enzyme is known as lipase. Second, all milk contains varying amounts of fat. The progressive changes in flavor only indicate the progress of fat decomposition in the milk.

However, only the milk from some cows is capable of natural lipase action after the milk has been cooled. Such cows include those in advanced stages of lactation, particularly in the late winter. The joker in the deck is that the lipase may be activated so that all milk will show lipolytic activity after cooling.

Research workers have shown that this activation is easily accomplished by thoroughly shaking the whole raw milk while the butter fat is still in a liquid or semi-liquid state. The lipolytic activity is then continued after cooling, and has been shown to be independent of breed, season, or production of the cow. Going a bit further, Krukovsky and Herrington showed that such action was accelerated by slightly warming the milk, and then again cooling it. Now that we know the cause of the "cowy" flavor, and its relatives, what do we do about it?

We have the word of the experts that it is bad practice to agitate the warm raw milk. For a starter, let's go easy in our handling of the milk before we get it cooled.

This cooling business is important too, in the reduction of lipase activity. Our friends, the scientists, are pretty well agreed that it is the rate of cooling that counts, rather than the storage temperature. For best results, they say that the milk should be rapidly cooled, preferably in a matter of seconds.

But suppose we have some of those cows we mentioned a few paragraphs back. Those cows in advanced stages of lactation, the

producers of so-called "lipase milk." Even without shaking, their milk shows lipolytic activity after cooling, no matter how rapid the process. What to do with such milk? At the present prices we wouldn't want to feed it to the hogs.

As it happens, we won't have to. According to Tarassuk and Henderson, the mixing of lipase milk to four or more parts of normal milk will always prevent rancidity. Providing, of course, that the mixing is done within an hour after milking, just before or just after cooling. If the lipase milk is allowed to age separately after cooling, and thus becomes rancid, the addition of a small amount of the normal milk will give a rancid flavor to the whole supply, maybe not completely rancid, but with such flavors as salty, bitter, sweet, or flat. This rancid flavor has more degrees than a thermometer, so don't be fooled by it.

That leaves one other flavor to be considered in raw milk. The one that is caused by the use of odorous disinfectants is obvious enough so that it is not hard to decide what ought to be done. Maybe some day science will supply us with an odorless germicide. Until then, we'll just have to be careful in our use of the present variety.

So far, we have only been concerned with the flavors in raw milk. It wouldn't be fair to close this discussion without mentioning the flavors common in pasteurized milk. These flavors known as "oxidized," are peculiar to pasteurized milk. They are due, believe it or not, to the absence of bacteria.

Normally, the bacteria in milk use up oxygen, thus making it impossible for the oxygen to combine with anything to produce compounds. In the pasteurized milk, the bacteria have been almost completely eliminated, but the oxygen remains. It is free to combine with fat, lecithin, and other milk components to form new compounds, some of which are quite pungent. In brief, that is how the oxidized flavors are formed in pasteurized milk.

The commoner flavors are metallic, fishy, oily and tallowy. There are four major causes of such flavors. In order of importance, they are: 1, Dissolved oxygen in the milk and cream. 2, Copper in the equipment. 3, An enzyme (oxidase) in the milk of certain cows. 4, Exposure of milk to direct sunlight. With the causes known, let us see if we can do anything about these flavors.

In regard to the first flavor, the oxygen might be removed. This is done by a vacuum apparatus, but is too expensive for general use today. The main thing to be happy about is the fact that the process gets results.

Such a machine has been tested at Cornell University, and deaerated milk has been held for a month with no development of oxidized flavors. Check samples were unfit for consumption after similar holding. Doubtlessly there is a place in the future for this kind of equipment, once it can be produced cheaply enough.

As milk is processed today, copper in equipment is probably the commonest cause of oxidized flavors. It is placed second in importance here, because if the oxygen were removed from milk, even copper could not produce oxidation. To prevent trouble, copper-free stainless steel equipment is recommended. By equipment is meant every part that may touch the milk, including even valves, pumps, gates, and so on. Glass lined containers are also satisfactory.

That brings us to a consideration of oxidase in the milk of certain cows. This enzyme is a dog of a different breed as compared to the lipase we were dealing with in raw milk. The lipase broke down fat in milk. Oxidase enables reduced milk components to combine again with oxygen. It may be a greatly underrated cause of oxidized flavors in pastuerized milk.

These flavors are commonest in February and March. Guthrie and Bruckner estimated that during this period, 35 per cent of the cows gave milk containing the enzyme. When it is present, flavors appear even when the milk is milked into and held in brown glass bottles to protect it from metal and sunlight.

If it is definitely determined that oxidase is the cause of "off" flavors, about the only solution lies in tracing the troublesome milk and using it for something else. A pasteurization temperature of 170 degrees Fahrenheit for ten minutes will inactivate the enzyme, and prevent the development of the oxidized flavor. However, such treatment leaves the milk with a "cooked" flavor, which is certainly not much of an improvement. About the best we can do is hope that we don't get very much of this oxidase milk.

Oxidized flavors due to exposure to sunlight can be corrected easily enough. Bottling milk in direct sunlight, hauling bottled milk in open trucks, and leaving milk on sunny doorsteps are a few of the wrong things to do with milk. Of course, if your customers like milk with a fish oil flavor, there's no cheaper way of getting it than to let the sun put it there.

What It Takes to Succeed as a Breeder

Condensed from The Hereford Journal

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It is quite simple to classify breeders on the basis of their achievements. There are those who have distinguished themselves by making an outstanding success, those whose attainments are in no way noteworthy but just different or average, and finally those who definitely fail.

A survey of the successes brings out the fact that the biggest barns, the greatest number of the most fertile acres, and the broadest resources in a physical and financial way are not always the means to the most successful ends. Not that those things do not give a distinct advantage to their possessor, but so many notable animals come from obscure farms of meager equipment, limited acreage and even small herds, that we are forced to the conclusion that something more than the physical is responsible for many of the most conspicuous breeders' achievements.

In fact, we recognize the man-factor, or the human element, as the key to successful stock-farm operation. Give a breeder every facility that money can buy in the way of farms, barns, and even foundation stock, but without the judgment and skill of the experienced cattleman the enterprise will be short-lived and of no more than casual importance while it lasts.

On the other hand, it is just as difficult to keep a good man down in the cattle business as in any other. If he has it in him he will usually find a way to give his talents play and will succeed often over almost insurmountable obstacles.

Since the cattleman himself is the determining factor in breeders' successes it is quite natural to inquire just what these personal attributes of success embrace and how they may be emulated by other breeders. There is no secret code guarding the methods of most of these men and it is not a difficult matter to observe and study the principles which they practice.

It would seem that the most logical way of ascertaining what might be considered the essential reasons for a livestock breeders' success would be to analyze the methods and facilities employed

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by selected breeders whose successes are generally recognized. Such an appraisal of the means of becoming a successful breeder reveals a variety of contributing factors which, for convenience of discussion, may be set up collectively as personal attributes and then, in turn, they may be broken down into items of greater detail.

In the list of personal attributes to be distinguished from physical and livestock equipment are: an intelligent interest, clear vision and foresight, liberality of both mind and money, a persistent and consistent effort, salesmanship, integrity, an ideal for guidance in selection, proficiency as a judge in the practice of selection, a breeding program, and building a breed structure.

The first of these, in sequence, is an intelligent interest. One always does best with what he likes best and in those activities in which he is most interested. But he must be well enough informed in what the breeding of Hereford cattle, for instance, involves to be sure that his interest is well advised and going to be permanent.

Many cases have been observed where initial interest has waned rapidly after the first flush of pride and enthusiasm over owning a winner gives way to the grim realities of the many problems in herd management such as the raising of a 90 percent calf crop, fitting successfully for show or sale, or the control or eradication of disease. One should prove his interest to be real and resistant to the many setbacks that seem inevitable before he backs it with an investment.

Clear vision and foresight on the part of the would-be successful breeder are highly important. The turn-over in generations of cattle is comparatively slow, about three years to the generation, and the breeder must look down through the forthcoming breeding seasons with judgment and accuracy if he is to come out with a successful conclusion to his operation.

He must be a forecaster and a prophet, in a way, but with something more dependable than a crystal ball upon which to base his predictions. He must interpret the signs of the times, note early the beginnings of trends and be keenly alive to what goes on in the livestock business.

The successful breeder must be possessed of two kinds of liberality—one of mind and the other of money. Stockmen, as a class, are big, broad, open-minded people and it has been suggested, with reason, that a narrow, selfish outlook is so ill-adjusted to this business that a man so possessed eliminates himself.

A leading Eastern beef-cattle breeder once said that his most beneficial show season was the

one in which he was most badly beaten. This statement made sense only after he explained that it took just such an experience to show him the shortcomings of his own cattle and put him on his way to ultimate success. Only a liberal-minded breeder could thus interpret initial defeat as a benefit.

During the current reign of high prices it has been generally conceded that reasons, other than the intrinsic worth of the animals, have motivated many of the liberal buyers who have thus been instrumental in establishing high prices. Be that as it may, it is still true with livestock, as with any commodity that is honestly merchandised, that you get about what you pay for—and the best costs the most dollars. To limit one's self in the amount of money to be invested is, therefore, also limiting the value of the livestock to be purchased.

Some eminently successful breeders have made their start by making most astute selections of what they planned to set up as foundation stock, then backing their judgment by calling upon all of their financial resources to get them bought. The ultimate success of such a procedure is more definitely assured than that of the buyer who skirts around the edge of the sale offerings buying a cheap one here, one off the other end there, because he cannot see his way clear to spend what it actually takes to buy the only kind fit to found a herd on.

A full appreciation of the intrinsic value of their animals is another attribute of a breeder's success. Horsemen used to have an expression for it—"Picked out of the bushes," i.e. bought from one who did not know his value. Many buyers operated with the ignorance of the breeder from whom they bought as their stock in trade. Ability to appraise, correctly, stock of his own breeding is essential if the breeder is to protect his investment. And the basis of this appraisal should be actual, not relative, value.

Persistence is the virtue upon which many farsighted breeders are capitalizing today. During the lean years of the early '30s they saw herds dispersed because the going was tough and the owners of such herds lacked both courage and conviction. These in-and-outers are now on the outside looking in when the business is really good for those who stuck it out and are now cashing in on their persistence through the low years.

Consistence is something else. There has been a lot of wishful thinking in the draft horse business and it is a matter of great regret that things are as they are, but the breeder who is as heavily invested in draft horses today as he was 10 years ago is not taking

a consistent view of the true situation.

In the past 45 years the hog breeders have been from one extreme of type to the other and half way back again. At the turn of the century the extreme lard or chuffy, type predominated, but was completely obsolete by 1920 when the big type had the call. Today it is a meaty, medium type which is most acceptable, and each of the extremes look funny in comparison. To have continued to breed the chuffy type in face of a falling lard market, or the big type when packers are demanding a higher yielding hog, would have been most inconsistent.

Those who first departed from the original English pattern of white-faced cattle possessed another important attribute of success in any worthwhile undertaking, independent thinking. One of the most helpless persons in any kind of an enterprise is the one who must follow someone's lead. Successful livestock men have done their own thinking and charted their course with intelligence after a comprehensive investigation of the important things involved.

Then there is the matter of salesmanship. In too many instances competent stockmen fail to realize in full the potential worth of their product through their inability to drive a bargain. They are successful in fitting their stock for sale but cannot consummate the deal. This necessitates either selling under actual value or sharing profits with a salesman or selling agency. There are natural salesmen, but salesmanship can be cultivated.

The following may aid in acquiring this skill: A. The purpose of the salesman is to locate the potential or prospective buyer, to create consumer demand and to break down sales resistence; B. First impressions are lasting and they should be formed under conditions that are fair to both seller and buyer; C. The seller must be sold himself; D. Know the potential value of your livestock and protect your interests in your prices; E. Follow up best sales with interest and service; F. Anticipate the repeat order upon which any substantial business is built. Thousands of dollars worth of livestock are bought or sold on a nod of the head, a shake of the hand, or merely the spoken word. There are few contracts in livestock transactions.

Integrity is the keystone that locks the arch of success. Without it all other attributes essential to success become of no avail. Some very capable cattlemen have been eliminated from the ranks of the successful breeders simply because they would not play fair. Misrepresentation of parents or substitution in pedigree registra-

tion, mis-statements in sales talks and deception in reporting ages, are a few of the dishonest practices that have discredited some otherwise successful breeders.

On the other hand, a breeder may build prestige by his reputation for square-dealing and the inviolability of his word that is as much of an asset to his business as is his reputation for breeding good cattle.

A preconcieved ideal to breed to is as essential to the breeder as is the target to the marksman. One seldom arrives unless he starts to go somewhere in a very definite manner. Too many livestock breeders do not know where they are going but, after a cost accounting of their operation is rendered, they know, too well, that they are on their way.

The livestock breeder deals in futures and it is therefore necessary that he project his ideal as an objective well in advance of his actual operations. To attain this ultimate objective he must sense possible shifts in type even before they become a reality. He should keep "on the beam" by constant contact with the markets and sales to learn the kind of cattle for which the high dollar is being paid, and attend, or get reports of the shows, to determine what type of cattle are winning.

Mere possession of an ideal is not enough, it must be corrected from time to time by frequent checks with market demand and showring awards. These two standardizing agents serve as the pitch-pipe or piano chord to the barber-shop quartet. They apprise the breeder whether or not he is operating on the key. Failure to correct his ideal and to make adjustments, in keeping with the times, may leave a breeder wide of his mark. However, one cannot be too independent in his choice of an ideal since, after all, the buyer rules the market and establishes values. It is simply good business to cater to his demand and meet his requirements. The successful breeder cannot be an isolationist.

Breeding is the regulation of the progeny by control of the parents, selecting to the correct ideal, with the view of improvement. No livestock enterprise can be consummated without resorting to judging. Its practice is, therefore, fundamental in all livestock operations, whether they involve breeding and fitting purebreds for show and sale or breeding and feeding grade cattle for commercial purposes.

The most glamorous judging job is in the showring and the person who makes show ratings assumes great responsibility since he establishes the pattern by which the breeder is guided in his selection. Showring awards may, therefore, lead or mislead the

rank and file of the breeders, depending upon the competence of the judge.

But to every judge who ties ribbons in the shows there are hundreds who practice judging of equal importance, but in a less conspicuous way, in the selection of stud, herd, and flock sires and foundation females.

Judging (selection) by the breeder is not limited to individual merit (pheno-type) as in the showring, but combines a consideration of pheno-type (showring form) and genotype (pedigree), supported, if possible by the progeny test.

A program should be formulated as the first step in setting up a livestock-breeding project. The breeder should be able to tell what type of cattle he expects to be breeding 10 years hence, from what lines of inheritance he expects to produce them, and to forecast, generally, his results. His planned progress should all be laid out and blueprinted, as it were. He should realize that breeding is definitely constructive and the breeder a builder of a very real, though intangible, structure.

This is where the advantages of financial resources come into the picture. The breeder of means can buy what his program calls for while the breeder of limited resources may be unable to finance the purchase of the sire of his choice. He may have figured out that a certain bull is the particular one he should have to get the job done with females bred as his are but he cannot afford to pay the price necessary to acquire this bull.

Many of those who have made most important contributions to our breed structure have been men of wealth but it must be admitted, on the other hand, that some businessmen with money have been responsible for dismal failures in livestock breeding.

Some of the greatest breeding establishments have been founded and operated by a partnership of banker or businessman, who had the financial resources, and a real cattleman whose funds of cattle lore lends to the partnership the competent leadership and managerial ability of which the financial partner is incapable. Many such cattle partners have been Britishers who had originally come to this country with imported cattle.

The personal attributes discussed do not constitute a panacea assuring success to all breeders, but they have been derived as a composite study of the practices of eminently successful breeders. They are, therefore, commended to ambitious and especially inexperienced newcomers in the breeding business, of which recent sales have produced a great many.

Black Frost

Condensed from Farm and Ranch

Hazel Upshaw

WHILE the whole world has been pushing forward with labor-saving machines and scientific discoveries, cotton has been struggling along with the very same methods that were used on the Nile 3,000 years ago. With the possible exception of power plows and a wholesome trend toward diversification, cotton farming is just about the same today as it was then.

But important changes are here now, and artificial defoliation of the cotton plant is probably the most vital factor in bringing about those changes. Defoliation makes mechanical harvesting possible, and mechanical harvesting is going to put cotton on an economic level with other farm crops on a world market.

It hasn't been easy to develop mechanical cotton harvesters. Nature tucked the cotton fiber away in a small boll closely guarded by the tough leaves and stems of the plant. Through all the years that men have been growing cotton, the cheapest and most efficient way devised to get to that fiber was with the strong, black fingers of the old Southern slave. But slave labor has long been a thing of the past, and with its passing, picking became the costliest part of raising cotton. Recent labor shortages have turned it into an annual headache for the cotton farmer.

The big problem in designing a machine to harvest cotton was to get the fiber without also gathering in leaves and trash that would damage the quality of the cotton. The first mechanical device that was used to any great extent was a sled with prongs in front that stripped the boll from the plants; but sleds were used only in the Plains area, where the cotton matured so late and frost came so early that the leaves were shed normally before harvest began.

Mechanical strippers were then designed with decided improvements over the sleds, and also mechanical harvesters that pulled the fiber from the boll, but neither machine could be used with any degree of efficiency until after the leaves had fallen. That's where artificial defoliation solved the problem.

Our cotton always has been forced to compete on world markets with foreign cotton that was

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produced by vastly cheaper labor than ours. Costs in Texas vary from an estimated 19.4 cents per pound in the Northeast Texas sandy lands to an estimated 8 cents per pound in the High Plains cotton area, assuming four-row equipment and hand harvesting. Machine harvesting of cotton can be expected to cut production costs to as low as 4 cents a pound.

It does not sound very exciting simply to say to the farmer, "Now you can defoliate your cotton before you are ready for harvest," but complete mechanization of cotton farming will revolutionize the cotton industry.

New uses are being found for cotton every day, especially in the chemical industries. New uses mean new jobs, and new jobs will help to strengthen and stabilize the economy of the whole cotton empire.

Like so many improvements we have, artificial defoliation came about by accident. The defoliant, of which calcium cyanamide is the active ingredient, was originally used as fertilizer. However, the dust had a toxic effect on the foliage to the extent that, even when used as a side dressing, any leaves that caught the dust soon wilted.

Then one year there came a season when the plants put on too much foliage. The bolls were very slow in maturing, and so an attempt was made to hasten their opening by the application of more calcium cyanamide, and that was the experiment that changed the whole picture for the cotton industry. Within nine or ten days, the leaves wilted and fell away without damage to the plant or the fiber, and the possibility of artificial defoliation became an established fact. It remained only to determine how much dust to use to the acre, and when and how best to apply it.

Under the supervision of Don L. Jones, superintendent of the Texas Agricultural Station at Lubbock, work on defoliation was started on the experimental farm there in 1944. The harvest is much later on the High Plains than in other cotton areas, and the growing season is much shorter for it averages only 211 days compared with 244 days in the cotton belt of the state. However, the results of those experiments can be applied to cotton in any other area, since the date for applying the dust is determined by the maturity and condition of the plant, and not by the calendar.

"We have found in our work at the Lubbock station that it is safer to apply a defoliant dust 30 days after the white blooms appear," Mr. Jones said. "We know that the fiber starts to form immediately after the blooms come, and within 20 days the fiber has attained its full length. After that

it increases in strength but not much in length.

"The leaves shed from 5 to 21 days after the defoliant is applied, and so the 30-day period between the first blooms and the application of the dust allows for the development of the fiber and, at the same time, accomplishes defoliation in ample time for harvest. The chemical defoliant injures the leaf cells, producing the growth of abscission cells at the base of the leaf stem and the part of the cotton plant to which it is attached, but it does not kill the plant, neither does it damage the fiber."

Much was learned by the early experiments in defoliation, Mr. Jones explained. It was found that the best defoliation occurs in the presence of moisture, either dew or rain, and that the moisture should remain on the leaves for at least two or three hours after the dust is applied. Moreover, if rain falls the first day following the application, little if any, defoliation takes place. Late plants receiving irrigation water do not defoliate as readily as non-irrigated plants, and there is a difference among various varieties. The large-leafed varieties do not seem to defoliate as readily as the normal-leafed varieties.

"The dust should be applied at the rate of 30 to 35 pounds to the acre," he continued. "The usual power-driven duster, with a few modifications, can be used with complete success. Mechanical dusters were designed for the use of insecticides, which weigh about 7 pounds to the cubic foot. However, as the defoliant dust weighs 44 pounds, it is usually necessary to reduce the number of nozzles of the duster and increase the power of the fan in order to force enough of the dust through the machine to make an adequate deposit on the leaves.

"The airplane has been used successfully for this work, and, since many military pilots are now interested in commercial flying, crop dusting is sure to find a permanent place in aviation. These expertly trained young pilots know exactly what it takes to put that dust on the rows of cotton. Flying low, they make an even distribution of dust over the field.

"There was one problem that complicated plane dusting of defoliants at first, however. Insecticides are white, and the pilot can see for himself the area he has covered, but the defoliant is black, and cannot be seen on the leaves from the air. This difficulty is solved by placing a flagman at the end of each strip that has been dusted, usually about 30 rows to the strip, and he signals the pilot when to turn."

Since the chemical defoliant is an ammonium product, the supply was limited by the war in

1944. Then 1945 was a bad cotton year, and not much was accomplished, according to Mr. Jones. But California used 600 tons of the dust, the Mississippi Delta used 400 tons, while some went to the Rio Grande Valley, and some to the farms on the Brazos river. While mechanical strippers have been available for some time, the production of cotton harvesters has been delayed by the war effort. However, volume production should be under way soon, and perhaps the old ways of cotton picking will become obsolete on countless Texas farms.

Of course, all farms are not adapted to mechanical operation. Small fields and rough terrain will still be hand picked, but even there the low cost of defoliating, which is about $1 an acre, is fully justified because it speeds the work of the pickers by at least 25% and, according to some estimates, by even as much as 50%.

Potatoes

An effective control against psyllid yellows in potatoes is reported by the Wyoming Experiment Station. The report is based on 1945 experiments directed toward controlling the psyllid insect which causes psyllid yellows. Control measures which were found effective were applications of any one of the three following dusts: a 325-mesh, conditioned dusting sulfur; conditioned sulfur-DDT, 1 to 5 percent (fused or mixed); or a mixture of 5-percent DDT and a suitable inert carrier.

Dusts of this sort were applied when the potato plants were 4 inches high. They were used at a rate of 30 pounds to the acre. When high populations of the psyllid were present, at least 4 applications were made at 10- to 14-day intervals.

While the psyllid population was not high in the 1945 Wyoming trials, the insects were found in damaging numbers. In this situation, out of eight combinations of the dust mixtures listed, all gave large increases in potato yields and, of more importance, greatly increased the yields of U. S. No. 1 potatoes.

—*Successful Farming*

More Profitable Sheep

Condensed from Breeder's Gazette

Julius E. Nordby

Director, U. S. Sheep Experiment Station, Dubois, Iowa

SHEEPMEN from 13 states and Canada were in attendance at the Annual Field Day at Dubois, Idaho, to review the work of the U. S. Sheep Experiment Station, the Western Sheep Breeding Laboratory and the Intermountain Forest and Range Experiment Station. The Station flocks appeared in full 12 months' fleece. 3500 mature sheep and the spring lamb crop were observed on the range, and 500 rams were examined at headquarters in more detail. Some rams were examined before shearing and also after shearing. The wool they produced was graded, and the shrinkage which had already been made from small side samples of the rams shorn was noted. It was of concern to the visitors to observe that even Rambouillet rams produce wool that shrinks as low as 55% and Columbia ram fleeces shrink around 48% and less. Some of these rams produce as high as 20 lbs. of light-shrink wool in 12 months under range conditions.

Four breeds are involved in the Dubois improvement program—the Rambouillet, Corriedale, Columbia and Targhee. The Columbia and the Targhee breeds were developed at this Station.

Sheepmen who examined the Rambouillet flock took special notice of changes that have been taking place in this breed in the last decade. Probably the change of greatest economic importance is the advance that has been made toward the open face character. While the task of breeding the wool away from the eyes of this breed is not yet complete, even at this Station, very notable progress has been made. Open face Rambouillet ewes produce each year under range conditions 9 lbs. more lamb than woolblind ewes. This is a gain of approximately 12% increase in production, based on a 75-lb. lamb, the open face lamb weighing on this basis 84 lbs. A very large percentage of this improvement represents gain, as the difference in gain is made entirely on the range when the ewes are lambed on the range.

The visitors saw Rambouillet sheep free from wrinkles. Breed-

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ing out skin folds has a great many advantages. The government flock has now reached the point of freeness from wrinkles where less attention need be paid to it, thereby making it possible to concentrate more on other matters that need attention. By careful selection and breeding away from wrinkles, only 10% of the weanling lambs now show undesirable skin wrinkles. The percentage of sheep with wrinkles has decreased so rapidly in this program that breeders of Rambouillet sheep can take courage in attacking the program in their flocks. Smooth Rambouillets produce more clean wool at this laboratory than the wrinkled Rambouillets.

Heavy pelts in Rambouillet sheep need not be a source much longer of price discount in feeder or fat lambs. They can be removed through selection, thereby also removing the hazards of fly strike and also relieving the tendency for short, greasy wool and wool blindness that appear to be associated with a wrinkled skin. Wrinkled skin is also a detriment in the effort to produce wool fiber of the same quality throughout the fleece. Fibers on top of the wrinkle are in general coarser than the fibers in the valley of the fold, and this contributes to lack of uniformity in the fibers of the fleece as a whole.

Length of staple appears to be associated in Rambouillets with skin smoothness. At this Station the smooth Rambouillets produce a longer fiber, therefore a lighter shrink wool and also a heavier clean wool content. Wrinkles, therefore, have not been found of any value in Rambouillet sheep at this laboratory.

The new Rambouillet also carries a more valuable carcass. The greater smoothness in general type, more desirable fleshing qualities, and their selection under range conditions for utility characteristics are making it possible for this breed to fill satisfactorily the role of usefulness which is required of this basic breed of the range industry in the West.

The Columbia, which was originally developed at this Station by crossing Lincoln rams to Rambouillet ewes for the purpose of fixing a type that would serve the extensive interests involving whiteface crossbred sheep in the Pacific Northwest and Intermountain States, has gained a wide foothold. The Secretary of the Columbia Sheep Breeders Association of America has recently reported that there are about 400 flocks of Columbia sheep in the United States. This association maintains an inspection system whereby all sheep for which an application for registry is made must be inspected and approved before they are

registered. The purpose of this inspection is to insure as far as possible that the sheep that are recorded maintain the high standard for lamb and wool production for which the foundation flocks are bred. By using rams of this type that have been bred for uniformity in type and wool production, the ranchman need not upset his wool quality production plan by alternating with the use of coarse wool and fine wool rams. It simplifies breeding operations and insures greater uniformity in his product.

The Targhee type of sheep was started at this Station by crossing Lincoln rams on Rambouillet ewes, and breeding the offspring of this mating back to the Rambouillet. This was taking advantage of the size, length of staple and mutton qualities of the Lincoln in producing sheep with the ranging qualities of the Rambouillet, as far as that was possible, and yet have an attractive fleece of ½ Blood quality and long staple, as well as a desirable body form. The Targhee is adapted to ranges that may not be good enough for the heavier breeds to do their best.

Studies in the shrinkage of western wool attracted attention. Sheepmen found considerable interest in inspecting the shearing shed at this Station out of which came the first sacked wool that was subjected to the core sampling method for determining the shrinkage of wool. As a result of the application of core sampling tests it is now a matter of record that shrinkage estimates of western wool in many states have been lowered, in one state about 5%. This means a difference of 50c per each 10 lbs. of grease wool, when scoured wool is worth $1 a pound. But of greater concern was the matter that this loss is a net loss. That is, if the shrinkage estimate was 5% too high, the grower would be giving away 50% of his net if his net when selling on the basis of actual shrink would have been $1 per each 10-lb. fleece. No business can stand such a loss and remain solvent. The farmer does not sell his wheat until he gets a test of how much wheat there is in the bag, apart from the chaff. But the wool grower sells his wool, that is now selling for about 50 times as much as wheat, on a guess as to how much wool there is in the bag apart from the dirt. These facts are of vital concern to the wool producer all over the west, and he is clamoring for public service in correcting this abuse.

Out on First Record?

Condensed from Iowa Farm Science

Dr. Jay L. Lush

HOW ACCURATELY can one decide on the basis of a heifer's first record whether she is good enough to keep?

We have studied the records of several thousand cows to find how nearly a cow will come to producing as well or as poorly the rest of her life as she did with her first calf. We find a general tendency for a cow to be always a good producer or always a poor one, but we find many individual exceptions. Some heifers that do very well with their first calves will turn out to be mediocre or poorer performers the rest of their lives. On the other hand, sometimes a heifer which does poorly the first time she calves will be average or better all the rest of her life.

On the average the first record of a heifer, adjusted for her age, is about 40 percent accurate as a guide to what she will do in her future lactation periods. So if a heifer (after correcting for her age) produces 100 pounds less than the herd, you can expect her to be about 40 pounds below the herd average for the rest of her life. Likewise, a heifer that excelled the average of her herd by 100 pounds in her first lactation is likely to be above the herd average by 40 pounds in her lactations the rest of her life.

Not every heifer will perform exactly in this manner, of course. Some will do better and some will do worse than is expected of them on this 40 percent rule. The 40 percent rule merely describes what the average heifer does. We make the fewest and smallest mistakes when we estimate the future production of each heifer by this rule.

If one culls too severely on the first record, he will discard some heifers which if kept would have been average or better producers the rest of their lives. If he doesn't cull heavily enough on first records, he will keep some heifers that will be unprofitable for the second and later lactations. The best procedure is a compromise—cull at once those with extremely low first records but give the doubtful ones a chance to prove by their second lactation whether the lowness of the first record really was their fault.

For most farms it would be roughly correct to cull the poorest one-tenth of the heifers near the

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end of their first record. If one does not have to cull any for mastitis, Bang's disease, tuberculosis and the like, possibly one might cull even as many as a fifth of the heifers with the very lowest first records as soon as they begin to go dry. The next poorest should be kept for a second record.

Whether the second record is going to show production about in line with the first record should be fairly clear by the time the second record is 4 to 5 months along. That is the time to do most of the rest of the culling. Cullings in the third or later lactations would be mostly because of poor health or poor progeny.

Because a dairy cow's actual production usually increases with age until she is around 6 to 9 years old, there is often some economic reason to keep a cow for a second or third lactation after having already invested in her the feed and other expenses necessary to get her through the first lactation, provided her production will more than pay for her feed. Such economic reasons do not apply to some other animals, such as hens, which nearly always produce more in their first year than in any later year.

The real reason that cows do not repeat their records exactly is that the conditions under which they make their records are never exactly the same in two lactations. The record a cow makes is the joint result of her own real ability and of the external conditions which affect her. The very highest records are made only by cows which have high ability and also get much better than an average share of good conditions. The very lowest records, likewise, are made only by the very poor cows which also happen to get more than a fair share of bad conditions—possibly bad weather, ill health, poor quality feed because of unfavorable weather, etc.

When a cow is kept for a second lactation she is still the same cow with the same high or low ability to produce milk and butterfat, but she gets a fresh sample of external conditions—health, temperature, feed and the like. Naturally, if the cow had unusually good conditions in her first lactation, it is much less likely that they will be as good in her second. On the other hand, the cow that had a bad break in conditions the first period will not usually be hit again by equally bad conditions in her second lactation.

We never know exactly what all of the influences during any lactation were, but when we sort cows merely according to their records, we automatically get in the high group more than a fair share of those which had better luck than average, and in the low group we get more than a fair share of the cows which had

poorer than average conditions when making their records. This is the reason for the general fact that the future production of a cow will usually be nearer the herd average than her known records are.

If a cow has two lactations and we judge her by averaging them, the good and bad circumstances in the two lactations will have some chance to cancel each other. So a cow's average of two records is a more accurate indicator of her real ability than one record is. The averaging process has simply cancelled a part of the errors which are due to environment.

Where we trusted a single record 40 percent, we should trust an average of two unselected records 57 percent, an average of three 66 percent, an average of four 73 percent, etc. But averages are less variable than single records and hence we cannot find as large differences between averages as between single records. The net result of not being able to reach so far but of getting a bigger fraction of what we do reach for is that for butterfat production, we gain about 1.2 times as much when we select between cows which have two records each as when we select between cows with only one record each. If we wait until the cows have three records each, the gain will be 1.3 times as much as if we selected when each had only one record.

To wait for additional records, however, takes time and it costs money if the cows are unprofitable in their second and third lactations. Also, to wait for second and third records on all of them lengthens the interval between generations, and this tends to make progress less per year, which will partly offset the gain from its making progress per generation more rapid.

The ideal plan is, therefore, a compromise. Cows whose first records are extremely poor should be culled late in their first lactation when their production falls below cost. Those with first records not quite so poor may well be kept until the first few months of the second lactation show which of them are genuinely poor and which merely had "bad luck" in the conditions under which they made their first records.

The likelihood of the record repeating itself closely — the repeatability—varies with different things. For example, test is more highly repeatable than pounds of fat—nearly two-thirds for test, as compared with 40 percent for fat.

As an example at nearly the other extreme of low repeatability (about one-sixth), consider the size of litter in swine. Many mistakes would be made in judg-

ing a sow's prolificacy entirely by the size of her first litter. The second litter tells nearly as much more about her as the first did. The third adds nearly as much more information as the second did. When characteristics have a repeatability this low, there is more reason for doing only a little of the culling early and postponing much of it until there is a second, third or even fourth record by which to judge the animal's real ability. In selecting for litter size in swine, progress would be about 1.3 times as much when selecting between sows with two litters each.

The actual differences between records are partly due to differences in the cows which made them and partly due to the varying circumstances under which they were made. When you select on records you gain in future production whatever of these differences really were in the cows. Averaging two, three or more records gives the differences due to individual and temporary circumstances considerable chance to cancel each other.

Your selections will be more accurate if you can postpone them until the cows have two or more records each, but the postponing costs some money, especially with the very lowest producers. Hence the wisest compromise is to cull a few with the very worst first records but to postpone much of the culling at least until the second record shows what it is going to be.

The general principle is that when a single record is only a moderately good indicator, some of the freedom to cull should be kept until you have two or more records.

By Benefit of Bacteria

Condensed from The Western Farm Life

J. E. Greaves

We are greatly perturbed, and rightly, over the havoc which has been and may be wrought by the atomic bomb. However, theoretically, other catastrophes could be even more devastating. If every man, woman and child were destroyed, man-created things would disappear, but nature would continue about as it is today. A rich plant and animal life would populate this globe and the grandeur of this world would continue unabated. If a greater catastrophe should destroy all soil bacteria, plants would soon die. This would be followed by the death of all animals, including man, and our planet would become a barren waste.

Hence, from this viewpoint, man plays second fiddle to the tiny soil microbes. This is due to their ability to take insoluble, unusable constituents in the soil and convert them into soluable, nutritious food for the growing plant. Bacteria are the true kitchen maids who prepare the banquet for the growing crops. The size and the nutritive value of a crop depends upon the efficiency with which the microbes prepare the meals. They not only prepare the food contained within the soil so plants can use it, but in some cases bacteria add to the plant food already present.

Nitrogen, which constitutes 80 per cent of our atmosphere, is useless to plants until it has been made available by man or microbes. Man can prepare it for the growing plant by the use of a gigantic arc light in a chimney through which a current of air is blown. The flame of this arc light has a diameter of 7 feet and reaches the temperature of 3,500 degrees Centigrade. The action of this heat on the nitrogen and oxygen of the air results in an acid, which if dissolved in water and neutralized by a base, becomes a nitrate—the food best liked by the hungry plants. Here man has taken valueless nitrogen and transformed it into a product worth 15 cents a pound.

A little arithmetic, however, makes it obvious that this is an expensive method of obtaining nitrogen for growing crops. One bushel of wheat contains 15 cents

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worth of nitrogen, 1 ton of sugar beets 75 cents worth, and 1 ton of timothy hay $6.00 worth. Hence one can see that a considerable portion of the returns from the crops would be taken to purchase commercial fertilizer nitrogen.

Soil microbes can also prepare the nitrogen for the growing plant. But how different is their method. They do it in the plant roots with little heat and no light. They obtain their water from the soil and their food from the growing plant. We do not know how they entice the nitrogen to join hands with carbon, hydrogen and oxygen, but we do know that they can and that the resulting product may be stored in the body of the growing legume. One ton of alfalfa hay may contain 50 pounds of nitrogen which, if purchased as a commercial fertilizer would cost $7.50. Under appropriate conditions with the proper bacteria present, this nitrogen may come from the atmosphere. The modern farmer makes sure that these microbes are on his legumes and that they have a proper environment in which to live and do their work.

The legume bacteria are absent from some soils and must be added. In other soils, they are present only in small numbers and it may be profitable to add them. In either case appropriate cultures can be obtained from reliable seed companies and mixed with the seed and the seed planted. The increase in yield and protein of the plant varies with the soil and the legume. A classic example is the one from the University of Illinois.

Cyril G. Hopkins grew alfalfa on soil with and without inoculation. He obtained from the alfalfa grown without inoculation, 1,180 pounds of dry alfalfa and from the inoculated, 2,300 pounds. He obtained twice as much alfalfa from the inoculated soil as from the uninoculated. There were 40 pounds of nitrogen in the inoculated alfalfa which had come from the atmosphere. This 40 pounds of nitrogen, if purchased as a commercial fertilizer, would have cost him $6.00, but by inoculation it cost only a few cents and the time necessary to inoculate the seed.

Inoculated legumes take nitrogen from the air and often contain greater percentages of protein than do uninoculated legumes. The average protein content of alfalfa grown over a period of 16 years in Utah was, for the inoculated, 18.07 per cent. Similar uninoculated legumes for the same period contained 16.82 per cent of protein. Therefore, the inoculated alfalfa on an average of 16 years carried 1.25 per cent more protein in the dry hay than did the uninoculated alfalfa. The stockman who feeds

the uninoculated alfalfa would be using hay much richer in the expensive food protein, and that at little greater cost.

When legumes are plowed under and wheat grown on such soil the following year, the nitrogen, calcium, phosphorus and sulphur of such wheat are higher than in wheat grown after wheat. Such wheat made into flour contains more protein, sulphur and phosphorus than wheat grown on adjacent stubbleland. Probably children receiving bread made from such wheat would manifest the difference in better growth. This we have not tested, but we have fed the wheat, together with milk, to rats, and found them to make better growth, to have better bones and in every way to appear better than rats grown on wheat which had not received the benefit of the green manure.

Therefore, we may conclude, we are not only dependent upon beneficial soil microbes for our food, but their action makes our food more nutritious. In this way they govern our efficiency and our attitude toward others, as the well-nourished individual possesses a better outlook on life.

Faster Fitting for Market Hogs

Condensed from The Berkshire News

R. H. Grummer
University of Wisconsin

LET'S stop for a few moments and reminisce about prewar times, when floors and ceilings on hog prices were unknown. Hog prices were then controlled by supply and demand, with supply being the chief factor for causing fluctuations in prices from one month to the next. Consumer demand varies slightly over a short period of time, yet supply varies greatly due to heavy seasonal marketings. Fluctuations in prices in prewar days had some influence in encouraging hog producers to have their sows to farrow early to beat the glutted markets in November and December. Furthermore, the wise hog producer practiced good management and fed balanced rations to get rapid gains so that he would be able to get his hogs on an early market and take advantage of the premium paid during the slack marketing season. During war times seasonal trends have vanished and little discrimmination has been made on weight and quality of hogs. These conditions have undoubtedly led to laxity in a planned marketing program. *The present situation will not persist indefinitely and we hope soon will be the day when hog production can return to normalcy.* Then, wise will be the man who is ready with his swine program to again take advantage of the high seasonal prices.

It would make for a healthier, more stable enterprise to spread farrowing and consequently marketing more uniformly over a longer period of time in seasson. It seems unfair that hogs of equal quality and weight should be selling for a dollar or two less in December than those marketed in August or September, when the cost of production is nearly the same. The buyers fluctuate the prices in an attempt to curb or increase the supply, and I'm sure they would be much happier if they could buy hogs at a more uniform price with more uniform receipts from one month to the next. It is the problem of the swine producers to solve the unhealthy situation, unless maybe the answer would be to maintain a price floor and ceiling during

Reprinted by permission from the Berkshire News, February, 1946, Springfield, Ill.

peacetime. This, however, has many objections and certainly cannot be planned for.

Perhaps the first and most effective step to take to straighten out the marketing curve would be to move up the spring farrow. Not only into March, but even as early as January and February. Thereby we could have a 5-month rather than a 2½- or 3-month farrowing season which would be reflected in the marketing the following fall. Already a few farmers are practicing January and February farrowing with good success. One of the best groups of hogs I saw last year were some that were farrowed during the end of December and the first part of January. It is true that with early farrowing it is impossible to take advantage of the sanitation afforded by farrowing on clean pasture, but on the other hand many of our troublesome diseases and parasites are dormant during the winter. This would be a distinct advantage where farmers are still trying to produce hogs on old infested lots. With extremely early farrowing the pigs have a good start and will resist disease and parasites when turned out. At the same time these pigs will be old enough to utilize large amounts of the early lush pasture. The sows can in turn be rebred for early fall farrow so that the fall pigs can get a good start on pasture before the winter sets in. Farmers who practice extremely early farrowing feel they have good success because the pigs come at a time when they have plenty of time to give the pigs proper care.

It must be remembered that early farrowing requires better housing, but the cold weather problem is reduced to a minimum with the use of pig brooders. One thing should be stressed and that is if pigs are to be farrowed early and confined to a house, the strictest sanitation should be followed. The sows should be scrubbed thoroughly and the pens should be cleaned and disinfected before farrowing.

There is a good evidence that pigs farrowed early are more vigorous and thrifty than later farrowed pigs. It is also reasonable to believe that the milk from sows farrowing early is better fortified with vitamins and other essential nutrients. For example, the body stores of vitamin A accumulated during the previous pasture season would be less depleted in January than they would in March, therefore we would expect more vitamin A in the milk in January than we would in March or April. Likewise, later on when the sows get on pasture the vitamin A would again go up.

At the best only a limited number of farmers are adequately equipped to shift farrowing to an earlier date. The bulk of the

pigs are farrowed between the middle of March and the middle of May. The average hog producer requires 8 to 9 months to ready pigs for a market weight of 225 pounds. This 8-to-9-month feeding period can be reduced to six or seven months by good feeding and management. If more farmers who have their sows farrow during the heavy farrowing season, could reduce the feeding period to 6 or 7 months, it would be a big step towards spreading out the marketing of hogs the following fall. The same thing applies for the fall pig crop.

Just a few key pointers which will help shorten the feeding period of market hogs are: (1) feed the sows well during the nursing period, (2) let the pigs nurse for at least 8 weeks, (3) creep-feed the hogs while nursing, (4) dip and drench pigs for parasites, (5) use a 3-year pasture rotation plan, (6) full-feed a well balanced ration during the entire feeding period, (7) supply shade and plenty of water, especially during the hot weather.

A short feeding period is correlated with profit. Less labor is involved, feed is utilized more efficiently, and a higher market price is realized in normal times by the hog producer who hits an early market.

Dwarf Cherries

The search on the part of the nursery industry for a method of producing dwarf cherry trees (both sour and sweet varieties similar to the dwarf apple trees) appears to be nearing success.

Tests which are being made at the New York Experiment Station, Geneva, indicate that the desired variety may be grafted on Mahaleb seedlings which have attained a height of about 26 inches. In this way, the Mahaleb forms the root and body stock while the desired variety makes the top of the tree.

Faultless unions have been made between this body stock and Giant sweet cherries and Montmorency sour cherries since 1940, all Mahaleb stock bore some fruit the third season from planting. Further observations must be made on the growth behavior of these trees before final conclusions can be drawn.

—*Successful Farming*

Heifers for Humanity's Sake

Condensed from the Pennsylvania Farmer

Norman F. Reber

ALONG a black-top country road in northern Maryland we saw the sign we had been looking for all morning. It said "Heifers for Relief," and it pointed to the Roger Roop farm, near Union Bridge. Since last July more that a thousand bred heifers averaging 25 months of age have chewed the rich grass at this stopping place on their mission of life to the hungry people over seas. From here they go by rail to Baltimore and from there to ports in France, Poland, Czechoslovakia, Belgium, Holland, Greece, Italy and other countries.

A convoy of three heavy trucks, loaded with 53 bred heifers from the farms of Pennsylvania, rumbled down the road, slowed down, and stopped at the sign. Milton S. Hershey, director of the heifer collecting center at the Keller Brothers' Kissel Hall Farm near Lititz, Pa., got off the first truck and went into the house to see Mr. Roop. Soon the trucks backed up one at a time into the feed lots and discharged the heifers, over half of which were Holsteins, about a third Guernseys, some Jerseys and Ayrshires. This lot from Pennsylvania, which included 14 registered cattle, would help to make up a cargo of 350 head, destined to leave Baltimore soon by UNRRA Liberty ship for Italy.

This episode was just another step in making a dream come true — a dream that was in the mind of a Church of the Brethren relief worker while he was in Spain in 1938. His name is Dan West. Discouraged with the thought that in war-ravaged countries children usually fare worse than adults, he started his church thinking about sending heifers to relieve hunger. A farm family that received a heifer would be on a fair way toward helping themselves. A heifer would convert even poor grass into nourishment especially for children. A heifer would have a calf which could give more nourishment to more hungry children, making fewer handouts necessary. And in lands where commercial fertilizers are used in a limited way, if at all, the manure would be precious fertilizer almost equal in value to the milk. With some of these thoughts in mind, Dan West came back to America determined to

Reprinted by permission from Pennsylvania Farmer, June 22, 1946, Pittsburgh, Penna.

do something for the hungry children of Spain, but the war came and interrupted the program. It did not really get under way until last year, when the first shipments of heifers went to Greece.

The heifer program is no longer solely a Brethren project. According to Thurl Metzger, of the United Church Relief Center at New Windsor, Maryland, the Heifer Project Committee of the Brethren Service Committee has in its membership representatives from the Evangelical and Reformed Church, Northern Baptists, Mennonites, Catholic Rural Life Association, and the fellowship of Reconciliation. There have also been contributions from the Methodists, Lutherans, Southern Baptists, Friends and other denominations. Full credit is given to other churches for the heifers they contribute. The object is to get as many heifers over seas as soon as possible, no matter from what denomination they come.

Once the heifer reaches a designated seaport, UNRRA provides the transportation over seas and pays "sea going cowboys" to care for the animals. These landlubbers have a terrible time with seasickness the first few days out, during which time there may be only a handful of able-bodied men to handle between 300-400 head of cattle and horses. But in a few days they are on their feet again tending the stock. Many "cowboys" are pastors, students, or people interested in Christian work. Without more than 700 volunteers secured through the efforts of the Brethren Service Committee, the UNRRA might have found it difficult, if not impossible, to get sufficient attendants for its own stock, not to mention the heifers sent over by the churches.

Most of the heifers stand the voyage very well. There is room enough in their stalls to lie down, so they are able to take the swaying motion of the ship without getting sick. If a heifer has a calf during the crossing it gets an extra stall. The attendants flush the stables frequently, so the cattle are kept under cleaner conditions than they are used to on the farm. The losses of cattle during the crossing have been very small.

Either UNRRA or Endsi, an overall relief agency which handles American relief, distribute the cattle. Children's institutions will receive first consideration. Then families are selected on the basis of need. A family which owns a horse will not receive a heifer. The family that receives the heifer is expected to share the milk with the family that owns the horse by trading milk for labor. Calves from the donated heifer go to other families which are in need.

Church representatives have visited countries in which heifers have been placed, to see how the program is working. The following is from a report by L. W. Shultz, representative of the Brethren Service Committee: "The families had just moved from East Poland into the state of Danzig and had settled about 30 miles from the city. Our crew of 18 visited the Ostravik community and saw 14 of our cattle in their own homes. This was two weeks after they had been placed and we found them in good condition and very well cared for. The barns were warm, airy and well lighted. In many cases the barn and the house were a part of the same building." One Polish official here in America was asked why his people took such good care of their cattle. His answer was, "No cattle — no children."

Galen Kilhefner, Secretary of Eastern and Southern Pennsylvania Districts of the Church of the Brethren, gives an example of how different groups can cooperate to get a heifer across the seas. A Sunday School class in Lancaster county wanted to buy some heifers but did not know where to keep them. They soon had an offer from a man who owned some land that he wanted to convert into building lots. He let them use it as a pasture. A group of men offered to make enough changes in a tobacco shed so that it could be used as a dairy barn. Still another group offered to provide the feed until the animals were ready for shipment.

It costs about $150 to buy a heifer and provide for its transportation to a shipping point. Sunday School classes, city churches and urban groups have found it cheaper to buy a heifer than to raise one. Many farmers, on the other hand, have donated their own heifers or taken care of an animal for a church group. Many farmers have done both.

Pennsylvania and Indiana are both hitting close to the 300 mark for heifers shipped across. People in the Keystone state who wish to increase that amount should contact Milton S. Hershey, Manheim, Route 3. He is in charge of all heifer collections from Pennsylvania and will be glad to arrange for the transportation of your heifer to the collecting center.

Demonstration Train

Condensed from Extension Service Review

AN 8-CAR special exhibit train toured the rails in New York State for 3 weeks in April, making about 40 stops and showing approximately 68,500 people some of the latest and most practical developments in farm and home research.

This is the first time in about a quarter of a century that such a demonstration train has been sponsored by the State colleges and the railroads.

Sixteen specialists lived on the train to explain the exhibits, answer questions, and were ready to describe some of the new things in research. Their schedule ran something like this: Up around 7 a. m. each working day; breakfast, 7.45 to 8.30; open for business at 9 to 12; dinner 12.30; another showing 1.30 to 4.30 p. m.; supper, 5.30 to 6.30; and on some days an evening performance started at 7 or 7.30.

As the train came to a stop the county agent of that county boarded the train and assisted the specialists in explaining the educational exhibits.

The train was made up of a flatcar with a full-size buck rake mounted on a truck and a long hay blower. A baggage car came next with an agronomy exhibit of hay and pasture mixtures and models of hay-making equipment. Next, a coach featured plans and methods on a modern dairy farm. The vegetable car showed, among other things, new weed sprays, new varieties of potatoes, and a home-made freezer. The poultry car featured labor-saving arrangements, poultry house ventilation, and egg handling.

The home economics car always had a full house. One car was devoted largely to labor efficiency in home work centers: A wide ironing board, an improved sewing cabinet, and ideas for an efficient dish cupboard. Comments overheard ran something like this: "I could easily do that in my kitchen," or "I'm certainly going to try that."

The last car was a rural housing exhibit with a model of a farmhouse as it now stands and as it could be improved. It also had a model tenant house. This car, too, proved almost a bottleneck, visitors were so eager to look at the plans and models there.

At many points school was dismissed so the agricultural and home economics students could visit the Farm and Home Special,

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and often the railroad siding was lined with school busses bringing them from near and far.

The soil test showing laboratory apparatus in the agronomy exhibit attracted considerable attention, as did also the dairy, poultry and vegetable cars. The train received wide publicity as it rolled along. Officials of the Canadian National Railways came from Montreal to board the train at Malone, as they are planning a similar train next year in Canada. The New York Times requested 15 pictures for an overseas edition which will carry the news of New York's Farm and Home Special even to foreign countries. Life magazine spent a day and a half taking pictures.

An illustrated printed report and a detailed statement are being prepared for general distribution for the benefit of other states wanting to know how the project was organized, the cost, and what to avoid, as gained from the experience in New York.

How To Repel Rabbits

Take a gallon of water and soap it well with naptha soap, which makes the mixture stick; then add two tablespoons of aluminum sulfate, stirring it well. Put the mixture in a hand spray and go over the plants. Another rabbit chaser is dried blood, sprinkled on the ground around the plants as all wild animals shy at the odor of blood. This dried blood works in two ways: it is a good plant food and it helps keep these garden raiders away. Rabbits have a fondness for growing things that are sweet, so you can obtain a bitter spray by mixing one quarter of a pound of bitter aloes in a gallon of water, and spray it on the vegetables. The best time to spray the garden is right after the sun goes down, so that the spray will be in full strength when the rabbits come to feed as soon as it becomes dark. If you use the sprays on the garden when the vegetables are about to be used, always be sure to wash them well in cold water to remove the mixtures. O.P.F.

Rural New Yorker

Fly Control

Condensed from The Dakota Farmer

"It's the greatest advancement in livestock improvement in our age," says J. B. Solem, Jerauld County agent. He was referring to the use of DDT for the control of livestock parasites.

In Jerauld County, N. D., they are really doing something to control livestock parasites. First, the county bought a spraying outfit at the cost of $600.00 complete with accessories. In addition, the Farmers Union Cooperative purchased an outfit with a 200-gallon capacity — capable of producing one thousand pounds of pressure.

When we first visited Jerauld County, late in June, the county-owned spraying outfit had already been used to spray 6,000 head of cattle. They expected to take care of about 10,000 head with this unit. They plan to spray three times during the summer for fly control. The second spraying was planned for two weeks after the first, and the third for three weeks after the second. These two pieces of equipment will be used for the control of flies, lice, grubs and weeds.

At the present time, farmers are paying, in this county, for this work at the rate of 15 cents per head. The operator of the spraying rigs furnishes all the materials and equipment. In other words, a herd of fifty cattle could be sprayed three times during the summer for a total cost of $22.50.

J. B. Solem told us that considerable experimental work has been done in Kansas and several other states. From this experimental work on the use of DDT to control flies he quoted the following:

"One farmer had used electric fly traps and had sprayed his dairy cattle with other types of fly spray before and after each milking. After using DDT spray, his dairy production increased eight percent. Another dairy farmer increased production 28 percent by the use of DDT spray, although he had not used good control practices previously.

"In an experiment with 600 head of beef cattle, one-half were sprayed with DDT and the other one-half were not sprayed. They were grazed on identical pastures within a half mile of each other. After 90 days the group of cattle which had been sprayed, aver-

Reprinted by permission from the Dakota Farmer, July 20, 1946, Aberdeen, S. D.

aged a ½-pound gain more per day. In another experiment they kept the flies off livestock with DDT and obtained a gain of 51 pounds per animal during the fly season."

Doesn't Take Long

We were on the Ernest Schlicht farm in Jerauld County when they sprayed approximately 70 head of cattle. As we drove into the yard we noticed that he had the cattle in a small lot close to the barn. The cattle were all driven into the barn while the operator of the spraying rig filled the tank with water and mixed the DDT. Two wooden gates were placed near the partially-open barn door, leaving enough room for one cow to come out at a time. The spraying equipment for the underline was placed in this passageway. The operator then went into the barn with the hand nozzle and sprayed the backs and sides of a few of the cattle held in one part of the barn. They were then driven out through the passageway over the underline spray. From the time we arrived on the farm until the job was completed took about one hour.

The county-owned spraying rig has a tank of 150-gallon capacity and can build up as much as 400 pounds of pressure. With 150 feet of hose, they are able to locate the outfit at some convenient place outside the holding pens and still reach the cattle conveniently.

Mr. Solem, county agent, told us that they were using a solution which contained two-tenths of one percent DDT for spraying the cattle. When they sprayed barns they increased this to about five percent. He said they were spraying the ceilings and part way down the walls and that you should not expect the flies to die immediately. It sometimes takes an hour or more for them to die. One precaution he gave is that you should keep oil sprays away from livestock.

Low Roads and High Roads

Condensed from the New York Times Magazine

Arthur Wallace Peach

To argue that roads have personalities may sound not only novel but also fantastic, but anyone who has found himself by accident or design welcomed into the goodly fellowship of roads will vow that the idea is not so wild after all. Of course, not all roads and highways can squeeze into fellowship. The hard-surface highway, the parkway, and roads of similar types where a pedestrian risks life and limb are decidedly not eligible to membership. The roads I have in mind are definitely country roads along which a man can poke in all seasons of the year — roads that will meditate with him, go vagabonding with him, startle him with sudden vistas of beauty, and sneer at him if he weakly excuses himself from a difficult climb.

Here are a few of my road comrades, largely in New England, although they may be found, each with a different personality, in every section of the country. One of my favorite roads has a long history. It began as an Indian trail, then the pioneers used it, turning it into a rough road for oxen; then it was followed by colonial troops on their way north to battle the English; now it wanders leisurely through a small farm country. I know its long history, but seldom do I walk it that it does not turn over pages I had not seen. No highway department can build such a road, no matter how many millions it may have at its disposal.

I still look out of the corner of my eyes at another road. I had been riding over it in a light car — only the old or infirm should use a car — and came to a hill, and down that hill the road jolted me with twenty-one "thank-you-marms" — twenty-one! I counted them on a later trip. For the benefit of the uninitiated let me say that the country road commissioner had put ridges across the road in order to get the rains out of the road quickly and also to enable a team to be "spelled" a bit as it went down.

Going down and over twenty-one humps was torture, and I swore that that road was one that would never know me again. But on foot, hiking, it proved to be a fine comrade; for, as you went up one hill, it had a way of saying, "something to surprise

Reprinted by permission from New York Times Magazine, June 23, 1945

you, old fellow, over the top," and it was right. Dipping over the top of the hills on many trips, I always ran into "something to surprise me" — wild things such as deer, rabbits, grouse; swift colors of foliage, sudden music of brooks with new notes, many an item stored away in a book of memories that one accumulates who belongs to the fellowship.

Still another road friend is a vagabond — one of the most unhurried roads I have known; and no man, with haste and unrest in his soul, can possibly walk it in any season without losing that haste and unrest, so deeply is the mood of the vagabond woven into every mile.

One road is a confirmed gossip. Although it is only five miles long, I have over and over again found it took a whole afternoon to walk it; it so happens that there are many farms along it, with the farmhouses close to the road, and a man simply has to stop to chat where chatting is made so easy. Of course, with the years and the friendships it has made for me, it takes longer and longer to walk those miles; but little do I care — time becomes for the road lover a minor matter, one of man's hideous inventions that really does not exist except in his confused mind.

Of course, there are many other roads on my maps of memory, each road with some appeal. In some moods, I like to go along with a silent road that has little to say; It follows a brook through miles and miles of woodland through which the sunshine seldom reaches to drop its golden dusk on the dusky earth. In other moods, the hill roads or ridge roads, bright and cheerful with the sunlight from dawn to dark, make an enjoyable companion for a day's hike. I am inclined to favor at times the hopeless run-down-at-the-heel type of road that does not care where it is going or when it gets there; and of course there is the road that leads you briskly on until it simply vanishes among the trees.

As for the names of such roads, I usually follow the accepted country term such as Gospel Hollow Road, Bull Run, Deer Meadow, Beaver Road, and so on. The deer and the beaver may have vanished years ago, but the name clings, and in many instances the road lover can uncover interesting tales by tracing the name back into history.

I poke down a country road to the edge of one of the great highways, and, "whist—whist—whist—whist!" goes the endless refrain of the automobiles hurrying by. Speed has its intelligent place in our modern world, but there must be and should be space and time for the leisurely step and the quietly beating heart, for the ex-

panded lungs, and the meditative mind; and along the country roads the fever of living does abate and the roar and din of machines ebb to a thrush's song.

The fellowship of country roads is a goodly one, and in that fellowship one can find lifelong comrades, passing acquaintances, and a wisdom that can be gained, perhaps, in no other way. It is the wisdom of fields and woods, compounded by the observing eye and the understanding heart; and it is a wisdom that does not grow old, that lasts until a man's hiking days are done and then it brightens many a fireside hour.

The Growing Importance and Uses of Sunflower Seed

Condensed from the Seed World

SUNFLOWERS have been grown as a garden crop by the Mennonites in Southern Manitoba since 1874. The seed, either roasted or in its natural condition, is used as a nut. At present about 100,000 pounds per year are roasted in Winnipeg for this trade, but it is as an oil crop that the seed has come into prominence in Manitoba within the last two years.

Sunflower seed, including the hull, has an oil content of about 30 per cent, as compared with 40 per cent in flaxseed. For edible purposes it is second to none; it is excellent for salad oil, deep frying oils, vegetable shortening and oleomargerine. Some eighteen million pounds were crushed in eastern Canada in 1944 to supply the edible oil trade.

As a source of edible oil, sunflowers are grown extensively in Russia and in South America. Since many of the other edible oils extensively used previous to the war were no longer available, Canada imported large quanities of oil from Argentina, and the importance of sunflower oil in Canada and the United States has increased tremendously. This has resulted in some 25,000 acres being grown in the prairie provinces, chiefly in Saskatchewan and Manitoba.

Sunflowers prefer light, medium soil. Such soil warms quickly in the spring, germination is hastened, and the number of days from seeding to maturity is reduced. The crop fits well in a rotation, and its culture is similar to that of corn. Because the sunflower possesses a large leaf surface, effecting high transpiration,

Reprinted by permission from the Seed World, March 15, 1946, Chicago, Illinois

more moisture is used to produce a pound of dry matter of sunflowers than of corn. And so slightly less remains in the soil after sunflowers than after corn or wheat. However, since sunflowers are a "combine crop," and rather long stalks are left standing, these collect and hold the snow. This snow-cover tends to compensate for the extra moisture removed from the soil by the sunflower crop.

Varieties

For seed production in Manitoba only Sunrise and Mennonite are recommended. Both are high yielding, with little to choose between them. Some new strains are under test. Yields of Sunrise and Mennonite range from 500 to 1,300 pounds per acre, depending upon the season and soil type.

Sunrise is a new Dominion Experimental Farms variety, increased on a limited acreage in 1942, and distributed only in Manitoba the following year. An area of about 6,000 acres was seeded to Sunrise. This variety is a selection from an introduction from the Russian Plant Breeding Station at Saratov. It is a dwarf type, about 4½ feet high, shorter and more uniform in habit than Mennonite. Unlike Mennonite, the center of the head of Sunrise tends to be hollow, or filled with empty hulls. In general, Sunrise produces only one head per plant but when the crop is unevenly or widely spaced, some basal branching occurs. Sunrise seed is less than half the size of Mennonite seed; it has a higher weight per measured bushel; and it has a greater content of oil.

The old, commonly used, Mennonite variety, as grown in Manitoba, is a mixture of types. It grows from 4½ to 12 feet high, and matures somewhat earlier than Sunrise. Some strains are as much as ten days earlier than Sunrise.

Killing Weed Seeds

Tests carried on for the past two years indicate the possibility that weed seeds can be killed in the surface soils of fields during the winter by applying small quantities of 2,4-D in the fall, leaving the soil ready for planting in the spring relatively free of weeds and also free of the killing chemical. Furthermore, the U. S. D. A. scientists that conducted these tests have reason to belive that 2,4-D may prove effective in killing weed seeds in barnyard manure.

—*Farm and Ranch*

Sheep Dog Trials

Condensed from The Eastern Breeder

Don Bell

Secretary, North American Sheep Dog Society

SHEEP dogs have been indispensable to the shepherds of the world for 3,000 years. In the old Roman era, throughout the Middle Ages and even up to the time of the early American agriculture, dogs were used principally to guard flocks against wolves and other predators.

Following the Middle Ages, agriculture, as well as most other activities in Britain, underwent revolutionary changes. In the sheep world the shepherds found need for a herding dog whose duty it was to guide, direct and gather, and otherwise assist with the management of the flock. Out of this need various types of dogs emerged. Of all these herding types none has ever surpassed and few have ever approached the Scottish Shepherd's Collie dog — the Scottish Collie. For nearly 400 years the shepherds have been breeding a canine assistant with remarkable talent for its task. As much as 200 years ago, according to accounts, the shepherd guided and ruled his flock merely by directing his dog at its work.

In 1875 a contest was held in Bala, Wales, to determine the gifted and talented in the Sheep Dog World. This trial for Sheep Dogs was won by a Scottish Shepherd and his collie dog. Since the first beginning the trial movement as a means of testing and measuring the talent of ability of these dogs has spread over the entire pastoral world. The number of such events in Britain, South Africa, Australia, and New Zealand is innumerable. The most famous in the world are the International Sheep Dog Trials of Britain, to be held this year at Edinburg, Scotland, September 19-21.

The first Sheep Dog Trials in North America were held in Philadelphia, Pa., in August 1880. While thrilling and captivating to thousands of onlookers, Sheep Dog Trials have been held only irregularly in this country largely because there was no organization back of the activity.

In 1940, the North American Sheep Dog Society was founded. This society conducts a Stud Book as a record of breeding to

Reprinted by permission from the Eastern Breeder, June, 1946, Warrenton, Virginia

guide improvement, and was also set up to conduct Sheep Dog Trials to encourage the breeding and improve the training of Sheep Dogs in gaining the larger objective — the better handling of sheep and other farm livestock. War-time restrictions interfered with the start of this program. The first official event of this society was the Sheep Dog Trials at Staunton, Virginia, June 19.

Anyone who has never witnessed a Sheep Dog Trial has a thrill awaiting; those who are familiar with them will be there on receipt of notice. It is the place where one can see animal intelligence at its highest development and after witnessing one of these events, it will not be difficult to understand why thousands of people turn out for these events in Britain.

Corn Borers Checked with Insect Parasites

Parasites which have been liberated in various localities in New Jersey are proving effective in reducing the destructive corn borer population, reports Harold B. Girth, of the State Department of Agriculture. A survey completed this spring by the Department's Insect Parasite Laboratory, at White Horse, reveals that the parasites have established themselves successfully in the localities where released and have spread to other areas to infest the larvae of the dreaded borers.

Upon rearing the larvae of approximately 4,500 corn borers collected last fall by scouts from farms and lots in New Jersey, laboratory workers found the parasitic wasps and a small tachinid fly have been extremely effective in reducing the numbers of corn borers. The parasites complete their own life cycle by depositing eggs, within the body of the larva of the borer. The young parasites eventually devour their hosts.

Four species of parasites were recovered from a large percentage of corn borers collected at the sites of liberation as well as in scattered locations throughout the Garden State. Satisfied with the results evidenced by the recent scouting study, entomologists at the insect laboratory have decided to make no further introduction of the fly which appears to have become well established in several localities. They plan to raise and liberate the parasitic wasps in order to distribute them throughout the State. — *Farm News Service, N. J. Department of Agriculture.*

Alfalfa — The Queen of Forage Plants

Condensed from The Southern Planter

Dr. T. B. Hutcheson

Dean of Agriculture, V. P. I.

ALFALFA is the standard by which all other legume hay is measured. It is not only high in feeding value, but is palatable to all classes of farm livestock; and under proper conditions its yields are favorably comparable to the best of the forage plants. It is also resistant to droughty conditions; and when once established, gives good yields in dry weather when other legumes are at a standstill. Another advantage is that it gives three or more cuttings a season, thus spreading the risk of total loss from unfavorable weather.

Alfalfa is primarily a hay crop that does not stand up under persistent and continuous close grazing. However, it takes a good supplemental pasture to be grazed off quickly when needed. When used for pasture, it should reach the early bloom stage before the animals are turned in, and enough animals should be used to graze off the crop in a 10-day period, after which they should be removed until another crop is ready for another growing period.

The best alfalfa soils are highly productive loams and clays. However, the crop may be grown successfully on any of the well drained soils of Virginia, provided its plant food requirements are met. The best alfalfa soils are usually the best upland grain soils. River and creek bottoms, and other low lands, are not well adapted to the crop, as certain diseases are more prevalent where air drainage is poor. Shallow soils, where rock is close to the surface, are also poorly adapted to alfalfa.

The lime requirement for alfalfa is higher than that of any other Virginia field crop. A soil test is required for individual fields in order to get a correct estimate of how much should be used for a particular condition. The crop seldom succeeds where the soil reaction is less than pH 6.5 to 7.0. The amount of lime necessary to bring about this reaction may vary from less than one ton on sandy soils, which have been recently limed, to more than three tons on heavy acid soils.

Recent experiments conducted by the Virginia Experiment Station show that it is best to divide

Reprinted by permission from The Southern Planter, July, 1946, Richmond, Virginia

the lime application, plowing or discing under half of the application several weeks ahead of planting, and applying the remainder on or near the soil surface and harrowing it in just before planting. These split applications have given approximately ½ ton more alfalfa for the season than where all was plowed under or all applied to the surface at planting time.

This same rule applies to fertilizers, as 400 pounds plowed under and 400 pounds applied at planting has given better results than where 800 pounds was plowed under or applied at planting. A safe rule is to plow under half of the lime and fertilizer, and apply the remainder just before preparing the seed bed for planting.

A good alfalfa crop removes large amounts of mineral plant food elements from the soil, and should not be planted on soils that are not naturally good enough, or are made good enough by the application of fertilizers, to produce at least 40 bushels of corn to the acre. Under average Virginia conditions, at least 100 pounds of phosphoric acid and 100 pounds of actual potash are required for successful crops of alfalfa. In addition to these mineral elements, on soils low in nitrogen, 16 to 30 pounds of actual nitrogen should be applied.

In terms of commercial fertilizers, this means the application of a minimum of 800 pounds of an 0-12-12 or 2-12-12 to the acre before planting. On very productive soils, the application may be somewhat less; and on poor soils, it should be more. Where applications of 8 to 10 tons of good farm manure are plowed under before planting, applications of 400 to 600 pounds of 20% superphosphate should be sufficient fertilization, as this amount of manure will supply the needed nitrogen and potash. On soils known to be high in potash, an 0-14-7 or a 3-12-6 fertilizer may be substituted for the high potash fertilizer already recommended. In fertilizing for alfalfa, it should be remembered that we are fertilizing for several crops, and should necessarily use more fertilizer than where only one crop is to be removed before the land is again fertilized.

In many areas, boron is deficient in the soil for alfalfa production. In such sections, 10 to 20 pounds of borax should be applied to the acre along with the fertilizer.

Inoculation is extremely important, and the seed should be inoculated with virile cultures before sowing, or the soil should be inoculated by drilling in 400 to 600 pounds of soil from an old, well-inoculated alfalfa field.

Alfalfa does best on a fine, firm seed bed. If the land is to be

plowed, it is best to plow several weeks ahead of planting and to wait until at least one good rain has fallen before seeding. The seed should be seeded only when the soil is well supplied with moisture, so that the young plants can come up and grow off rapidly. If alfalfa is to follow small grains or cultivated crops, a satisfactory seed bed may be prepared by thoroughly discing the soil to the depth of 3 or 4 inches and making a fine surface with a smoothing harrow. The cultipacker is an effective implement in making the surface fine and firm. Seed should never be covered more than one inch. An average depth of ½ inch is about right.

Although good stands in the beginning are essential to success with alfalfa, these stands will be of short duration unless the fields are given good attention. The first requirement is repeat applications of plant food made annually just before growth starts in the spring. Annual applications of 700 pounds or more of 0-12-12 or 2-12-12 fertilizer with 10 pounds of borax to the acre will usually profitably increase yields and lengthen the life of stands. Such treatments on experimental fields have kept the stands thick and vigorous for 10 or 12 years.

Another important factor in maintaining stands is cutting at the proper time. Alfalfa should be harvested when 1/10 to ½ of the blooms are open. Cutting too early has a tendency to reduce stands, and cutting too late makes poor quality and reduces total yields for the season. The crop should not be cut later than two weeks before the first killing frost date in the fall, as some fall growth is necessary for storage of plant food in the roots to encourage early growth the following year. A top-dressing of farmyard manure during the winter is always advantageous.

High Egg Yields Depend on Heavy Feed Intake

Condensed from Canadian Poultry Review

Fremont Conrad

HIGH feed consumption is the key to high egg production in a flock which has inherited high laying ability. It takes feed to make eggs — good feed, to be sure, but just as important, plenty of it.

How much feed does a chicken need in order to produce an egg? That depends on her size and rate of production. The accompanying feed consumption table offers a practical means of feeding a flock according to its production.

Successful dairymen feed their cows according to their production. The more milk they give, the more dairy ration they get. They have a handy rule of thumb formula: a pound of dairy ration for each three pounds of milk.

Poultry can be fed on the same profitable production basis. The higher the flock's production, the greater the daily feed consumption per 100 hens. To bring out the breeding in a laying flock you must feed the birds properly.

A laying hen is a factory, but she needs plenty of raw material before she can turn out the finished product. Saving feed will not reduce the cost of a case of eggs. If you cut feed you slow up egg production. Consequently, it takes your hens longer to fill a case of eggs.

If the inherited egg laying ability of a flock is stifled by insufficient feeding, the birds will be unable to make full use of the production characteristics that were bred into them. Many winter pauses in egg production are preceded by slumps in feed consumption.

This doesn't mean that feed is everything, of course. Housing and care are important. No one can lift the level of production beyond the inherited laying capacity of his flock simply by raising the feed consumption, either. The breeding naturally has to be back of the hens in the first place, if heavy production is to be secured.

How can a producer tell if his hens are getting enough feed? The only way is to weigh it. That means another chore, but not a daily chore. Weighing the mash

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and grain consumed once a week may be often enough.

If his mash hoppers do not permit waste, he can weigh the amount of mash left in the hoppers at the end of the day and subtract it from the amount put in in the morning.

To determine the average weight of his flock, he'll have to weigh half a dozen hens, too, for the feed requirements depend on the size of the hens. Warmth of the house, activity and temperment of the breed, will be factors also. Nevertheless, the figures in the accompanying tables are a good guide to follow. They indicate that only two extra pounds are needed to support each 10 per cent increase in egg production.

By following the simple tests outlined in the picture graph and feed table a poultry raiser will at least be feeding according to a definite proven program. The records of many commercial poultrymen and egg laying contests confirm these feed consumption and egg production figures.

What steps can be taken to maintain the proper level of feed consumption if a decline is detected? First of all the producer should seek to stimulate appetites of his birds by feeding wet mash or pellets at regular intervals each day. All the moist mash the hens will clean up in 20 minutes can be fed.

Those who wish to save the mess of moistening mash might feed four to five pounds of pellets per 100 hens right on top of the dry mash in the hoppers, or in shallow troughs on the floor. Feed intake should not be increased by forcing hens to eat more grain to build body weight. Mash will do the trick faster.

Other helpful practices are feeding more often, providing more hoppers, stirring the mash frequently, placing the hoppers parallel to the source of light so they are equally lighted on both sides. Shallow hoppers may be placed on the roosting platform for timid hens. Use of artificial light or an increase in the length of the working day if lights are already in use may also be helpful.

Feeding whole oats in hoppers likewise may prove beneficial. Oyster shell or high calcium grit should be kept before the hens at all times. Plenty of water should be provided and should be kept from freezing.

A recent USDA survey of feeds fed to farm flocks revealed that one-third of the farm poultry ration consists of commercial feeds. This indicates that a lot of poultry people have learned to depend on these formula feeds. They contain high quality, tested ingredients which meet the complete nutritional requirements of their laying hens.

Formula Feeds Get Results

That they produce good results is indicated by the fact that egg production during the past few years has reached all-time highs.

When flocks are definitely out of condition or "off feed," appetites can be stimulated by feeding a flushing mash for half a day in place of laying mash. The high content of milk products in this nutritious mash makes it appetizing and easily digestible, and gives it a gentle flushing action.

Some poultrymen feed a flushing mash half a day every other week the year round, to laying hens as well as growing stock on range.

While it takes *good feed* to bring out the laying ability of hens, they must eat *enough* of *it* if they are to maintain maximum egg production. The poultryman who puts the same effort into trying to supply the right amount feed to his flock as he does into trying to furnish his birds with the best feed obtainable should have little trouble in securing results.

Good feed plus plenty of it add up to bigger poultry profits. Full feeding of efficient birds, as shown by the accompanying charts, is actually a feed conserving practice.

—Poultry Supply Dealer

FEED NEEDED TO PRODUCE A CASE OF EGGS

Rates of Production	40%	50%	60%	70%
Days to Fill Case	9	7.2	6	5.1
100	Lbs.	Lbs.	Lbs.	Lbs.
4 lb. hens	216	187	163	153
5 lb. hens	234	202	180	163
6 lb. hens	252	216	192	173
7 lb. hens	270	230	210	189

To find how much feed is invested in each case of eggs a flock produces:

1. **Find the days needed to fill a case, by dividing 360 eggs (in a case) by rate of production. Example:**

   360 ÷ 60% = 6 days.

2. **Multiply daily feed recommended for hens of flock's average weight and production (See Feed Consumption Table) by the number of days needed to fill case.**

Example: 100 hens averaging 4 pounds, laying 60%, should eat 28 lbs. of feed a day. They will fill a case in six days, and consume 168 pounds of feed per case.

FEED CONSUMPTION TABLE

Based on Equal Parts Mash and Grain by Weight

Daily Feed Recommended for 100 Hens to Support Indicated Percentage of Production

Production	40%	50%	60%	70%
100	Lbs.	Lbs.	Lbs.	Lbs.
4 lb. hens	24	26	28	30
5 lb. hens	26	28	30	32
6 lb. hens	28	30	32	34
7 lb. hens	30	32	35	37

To determine whether flock is being fed heavily enough to support the inherited egg-laying ability of hens, follow these steps:

1. **Weigh enough hens in flock to find their average weight.**
2. **Find flock production by dividing the eggs laid per day by the number of hens. Example: 60 eggs ÷ 100 hens = 60 per cent production.**
3. **Feed the amount shown where weight and production lines intersect. Example: 100 hens averaging 7 pounds and laying 60 per cent should eat 35 pounds of feed daily.**

—Allied Mills' figures

Tips on Increasing Feed Consumption to Maintain High Egg Production

1. Feed mash and grain in equal parts by weight, in the amounts recommended in the Feed Consumption and Egg Production Table.
2. Feed grain more often during the day, but not as much at one time. Feed early in the morning and late at night.
3. Provide more mash hoppers, located in good light. Fill and stir contents frequently.
4. Feed a moist mash daily, preferably at noon, in plenty of flat troughs which will permit all hens to get their share in 20 minutes' "clean-up" time.
5. Feed 4 to 5 pounds of pellets (compressed mash in appetizing form) per hundred hens. Feed regularly each day, preferably at 4.00 P.M.
6. When hens are out of condition or "off feed," jaded appetites can be stimulated by feeding flushing mash. Its high content of milk products makes it extremely nourishing, easily digestible and mildly flushing in action. It is usually fed for one day in place of laying mash. Some feed it regularly one-half day (in the morning) every other week all winter, or the year around when hens are confined.

The Farmer's Wood Bank

Condensed from Pensylvania Game News

George H. Wirt

Senior Forest Fire Warden, Pennsylvania Dept. Forests and Waters

It is not unusual to hear someone tell about a farmer who paid off the mortgage on his farm with the money he received from a good crop of potatoes. Probably more farmers have paid for the college education of their children from the old wood lot. Innumerable farmers have been able to replace a barn, house, or other building because it was possible to get the necessary timber from the woodlot.

Not long ago a story was passed along about a lawyer who planted several abandoned farms to black walnut trees instead of taking out insurance. When he died he left the farms to his wife and daughter. The investment paid a net annual return of about $10,000.

There are a few easily understood facts, known to most farm land owners, by reason of which there can be no question as to the woodlot becoming the farmer's bank.

Most farms in Pennsylvania already have a part of their area devoted to tree growth. Those that do not are certainly incomplete. It should be kept in mind that trees will grow on rough, shallow, wet, steep or poor soil on which no agricultural crop can be grown profitably. Fence rows and inconvenient corners will grow trees and result in timesaving every year.

Moisture in soil and atmosphere is a very essential material for the raising of good and plentiful soil crops. Exposure to winds results in a drying out of crops and soil which shows itself immediately in reduced growth and reduced final yield.

On the other hand, the planting of wind breaks of trees across the usual paths of local wind results not only in an accumulation of wood in the trees but also in an increase in farm crops. When these wind breaks are made with shrubs, as well as trees, shelter is provided for game and insectivorous birds which add further to the increase of crops and to the value of the farm.

The ways a tree grows corresponds to the way money accumulates in a trust fund. The little tree starts from seed and

Reprinted by permission from Pennsylvania Game News. April, 1945, Harrisburg, Pa.

there is produced the wood of the first year's growth. The second year's growth of wood is laid over that of the first year. The third year's wood is laid over the cone made up of the first and second years, and so on. The first year's wood is the capital, the next year's wood is the first interest. The two amounts are the capital to which the next growth or interest is added. That is a natural demonstration of the way compound interest works. At any given date, therefore, the total amount of wood present on a tree or on an area devoted to tree growth is the accumulated annual crop of wood less any amount which has died, decayed or been removed.

There are several advantages in this natural storage proposition and also several disadvantages. When a farmer raises a crop of tomatoes, he has to harvest them when they are ripe and something must be done with them immediately. Corn, wheat or potatoes may be stored on the farm and can be held for one or more years but with some loss. Annual crops of wood, however, have to be stored until their accumulation results in a tree or trees big enough to use. But even then they can be stored still longer until it is the wish of the owner to harvest all or a part of the crop. The time of harvest can be made to coincide with the owner's needs for wood, or cash, and may be held up until prices are high.

As long as the trees are healthy and neither too far apart nor too close together they will continue to grow at a good rate of interest. However, if they are allowed to crowd each other, production is reduced and if the tree branches do not cover the entire area, sun, wind and rain are wasted and not turned into wood and the crop is not as great as it should be.

Since wood in trees is nothing more than sun, wind and rain combined by the chemical action that takes place in the leaves and since there is approximately the same amount of sun, wind and rain to an acre of land each year, if the leaves cover the entire acre, the annual crop of wood will be approximately the same. It is a plain conclusion, therefore, that the area devoted to wood crops should be completely covered at all times with leaves of valuable kinds of trees kept at the right spacings for rapid growth and only healthy trees should be kept in the group. If, in time, the trees do not increase at a rate of interest equal to, at least, 3% they should be cut so that the younger trees growing at a faster rate may take their place.

Most farm crops have to be reseeded for each crop. A new forest must come from seed or sprouts and can be started under

old trees by careful cutting of trees and stirring up of the ground to receive seed as it falls from the older trees. After the younger trees get started, the remaining older ones may be removed and a new forest is on its way. The old trees will have been completely harvested and used to advantage. So a forest area may be continually maintained as a forest and yet the wood crops may be continually harvested, either regularly or irregularly.

If fire, grazing, failure to get new trees started or anything else opens up the growth, production is lowered. If trees of low value or in poor shape or health are permitted to occupy the ground then production is lowered. Good judgment in the handling of the tree crops pays just as big dividends as good judgment in handling other crops.

One outstanding disadvantage of the accumulation of crops in trees is the fact that the tax assessor does not distinguish between a value for the acre determined by its net income instead of a value made up of the accumulated crops for a great many years. As a matter of fact, however, such a proper method of determining assessment values may not reduce the current values used. Another very disturbing disadvantage is that a fire or other destructive force will destroy not one year's growth, but will affect the accumulation of years.

Just now post-war demands for wood have resulted in high prices. It is a good time to harvest wood crops, especially the older trees. But help is scarce and the fellow who does the cutting is in a hurry and out to make as much as he can, so if the farmer sells his timber it should be only after he has had the advice of the Extension forester from State College or a forester from the State Department of Forests and Waters.

The farmers of Pennsylvania have millions of dollars worth of value in their farm woodlots. They can double the amount easily by reforesting poor land and by better handling the areas now growing forests.

It is amazing how few of us do the best for ourselves and our community or accept the help of those who are willing to help in the things about which we know so little.

Cooperation should be the watchword of the day.

Soil Management
It's Influence on Apple Tree Roots

Condensed from The Eastern Fruit Grower

Clarence E. Baker

Purdue University Agricultural Experiment Station

Most observations and measurements of tree growth by which responses to various treatments are evaluated are made upon the above ground portions of the organism. It seems reasonable that the root systems of fruit trees also might be influenced to their benefit or detriment by cultural practices. Because of the difficulties involved in studying root formation comparatively few such observations have been made and what goes on beneath the soil remains more or less a mystery.

Certain practices are known to influence root formation to an extent that can easily be observed. For instance, if the orchard is plowed or disced, it is obvious that the roots in the cultivated area are severed from the tree. This, undoubtedly, produces some effect upon the tree, either temporary or permanent in nature.

Another response almost as universally recognized among fruit growers, is the stimulation of roots in the surface region following the application of a heavy mulch. Most growers are familiar with the masses of small, fibrous roots that appear in the soil just below a mulch of straw or other organic material. These small roots appear upon the surface of the soil and even well up into the mulch itself when abundant moisture is present.

It is also a rather common observation that when the mulch and the soil beneath it become dry, these small roots appear to die. This has led to great concern among fruit growers as to the ultimate effects of mulching as a cultural practice. Would not mulching over a period of years cause trees to become shallow rooted? If, after trees had become well established under mulch culture, it should become necessary to discontinue the mulch, or, if an extreme dry period should prevail, would not the loss of these shallow roots be harmful

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or even disastrous to the trees?

These questions in the mind of observing fruit growers have caused many of them to delay in carrying out a comprehensive mulching program in spite of excellent results obtained on a small scale.

Root studies that have been conducted in connection with our soil management investigations with apples, serve to answer these questions. The first studies were made by Dr. Cullinan and myself in our early work at the Laurel orchard. The roots of trees grown in cultivation, straw mulch and bluegrass sod, all without nitrogen or other fertilizers, were studied in detail. Eight 8-year-old trees grown continually in each of the three above systems were dug and observed. Trees in cultivation were the largest and had the deepest and most extensive root systems. Trees grown in sod with a mulch of straw were slightly smaller, but there was little difference in the size or distribution of the roots, with the exception of the fibrous roots that were growing just beneath the mulch and which, of course, were not present on the cultivated trees. Trees grown in bluegrass sod without a nitrogen fertilizer made very little growth and were only a small fraction of the size of cultivated or mulched trees. Their roots were very small and restricted in depth.

In the fall of 1943 root studies were made on 21-year-old Grimes trees in our soil management plots at Lafayette. Trees in cultivation straw-manure mulch and bluegrass sod were compared, using the trenching method in order that the root distribution in each soil horizon could be studied. All of the trees in sod receive liberal amounts of sulphate of ammonia each spring and half of the trees in the other two treatments receive similar applications.

In these studies, again, there was found no basis for concern regarding the effect of mulching on root development. Mulched trees, on the average, had as many roots at lower levels as trees in the other treatments, in addition to the roots near the surface and within the mulch. The mulched trees are vigorous and highly productive.

As the trees growing in bluegrass sod have received liberal amounts of a nitrogen fertilizer annually, they have made excellent growth and are the largest trees in any of the three treatments, in contrast to the trees at Laurel in sod without nitrogen. They also are very productive. The roots were found to be well distributed and similar to the other treatments in size and depth.

The cultivated trees are the smallest of those in any of the

three treatments. They are making little annual growth and bear very little fruit. The root systems of cultivated trees receiving no nitrogen fertilizer were smaller than those of trees in sod or mulch, but the roots of cultivated trees receiving annual applications of nitrogen compared very favorably with the roots of trees in other treatments.

It is true that the small, fibrous roots that appear in such large numbers in and beneath a mulch are killed, or at least rendered temporarily inactive, in extremely dry periods. This seems to have no detrimental effect upon the tree, however, as the deeper roots continue to function and are able to supply water to the tree as long as moisture is available to them. When favorable moisture conditions again prevail on the surface, the fibrous roots, for the most part, become active again. New masses of tiny rootlets are produced and these continue to function as long as conditions remain favorable.

Ammonia Gas Is Soil Fertilizer

Condensed from the Nebraska Farmer

THE application of fertilizer in a gaseous form to growing crops has been developed at the University of Nebraska college of agriculture.

The machine for dispensing the gaseous fertilizer consists of a pressure tank of ammonia gas (NH^3) mounted on an ordinary farm tractor. The tank of ammonia gas is connected with four shovel mounted tubes which put the gas into the soil under pressure. The tubes are mounted on a beet cultivator attached to the tractor and are dropped approximately five inches into the soil. Flexible high pressure hoses connect the dispenser tubes with the ammonia pressure tank through a constant pressure gauge.

Lester Larsen, agricultural engineer at the College of Agriculture, was responsible for construction of the new fertilizer "dispenser." It was demonstrated by J. W. Fitts, soil specialist at the college.

Fitts said that although no definite results are yet available, he believes that the gaseous fertilizer may prove more economical for farmers to use. He compared prices of nitrogen in ammonia gas with prices of nitrogen in ammonium nitrate, saying that the gaseous form costs approximately six cents a pound while ammonium nitrate costs about 10 cents a pound. Companies manufacturing fertilizer say that ammonia gas is more easily manufactured and handled.

Ammonia gas is approximately 83 percent nitrogen, the soil rebuilding element; with hydrogen making up the remaindar of the gas. The gas is, therefore, believed to be a more efficient form of applying fertilizer to the soil.

Ammonia gas is quickly absorbed by soil moisture and little loss results. The gas works best in soil that has recently received rainfall. However, so long as the soil is moist the gas is absorbed. The gas is absorbed into the clay and stays there to be used by the growing crop.

The idea of using ammonia gas for fertilizing crops is so new that no data is available on its effects on crop yields, but it is believed that little difference will be noted between results with dry or dissolved ammonium nitrate.

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Zinc-Coated Nails Check "Little-Leaf"

Condensed from Better Fruit

O. T. McWhorter

Extension Horticulturist, Oregon State College

"LITTLE LEAF" or "Rosette," a nutritional disorder of tree fruits said to be a zinc deficiency is destructive in in certain eastern Oregon fruit growing areas. Affected trees show small, tufted, light colored leaves. The affected parts of the trees dwarf and gradually die, fruit yields are reduced, and the whole tree may become worthless.

Zinc sprays, zinc injection, and zinc tacks used in demonstrations for control at The Dalles, Milton-Freewater, and in Union County effectively controlled the disorder on peaches, apricots, and cherry trees when properly used before the trees were too far gone. Sprays were not tried on prune trees.

Zinc sprays, zinc coated nails, or zinc tacks driven into affected trees proved to be the more practical treatments. Holes must be bored in tree trunks for zinc injections. Decay often enters through such holes which makes the zinc injection method undesirable.

Zinc-containing sprays may be applied as a dormant spray in late winter or early spring just before the buds break. Fifty pounds of zinc sulfate are used in 100 gallons of water. The trees are thoroughly covered with this spray. Do not mix with other sprays.

For the foliage sprays use 18 to 25 pounds of zinc sulfate in 100 gallons of water. Add one-third pound of hydrated lime for each pound of zinc sulfate for a safener. The foliage spray can be used without the lime if the grower wishes to take a chance on foliage burns.

Foliage sprays in trials at The Dalles appeared more effective when they were given four to six weeks after foliage appeared. Foliage sprays give seasonal control, therefore they must be applied annually in most cases. Improvement usually begins to show within 30 days following application.

Foliage burns from zinc sprays may occur when rainy, damp weather follows spraying. Some times foliage burn occurs when sprays are applied during the

Reprinted by permission from Better Fruit, April, 1945, Portland, Oregon

heat of the day. Trees affected by foliage burn usually recover by the end of the season.

Developing fruit can be burned or damaged by foliage sprays. Growers sometimes wait until after fruit harvest to spray even though late sprays did not prove as effective as the earlier applications.

Caution — Mixing zinc foliage sprays with other spray materials or adding spreaders is not advised. One grower who tried mixing a short cut ruined nearly one-half of the trees in a young cherry planting.

Galvanized shingle nails for small trees and zinc-coated roofings nails for larger cherry, apricot, peach, pear, walnut, and prune trees were used at The Dalles and in Umatilla County.

Results have been a lasting check on "Little Leaf" disorders. Peach trees showed no evidence of return of "Little Leaf" six years after zinc tacks were driven into the trunks.

Use of zinc-coated nails for "Little Leaf" disorders appears to have advantages over spraying each season. Foliage sprays should be used on small trees. Nails driven in the trunks of very small trees can be damaging.

Nails are placed one inch apart up and down the tree and one-half inch apart across the tree. A spiral is formed by continuing around the tree with the nail placements. From 15 to 20 zinc-coated nails per tree trunk are considered sufficient. Remove the heads from the galvanized nails, drive nails about one-half way in. Driving them in flush with the bark usually results in bruised and damaged bark. As many as 30 or 40 nails may be needed for a large tree.

Curative results from zinc nails driven into "Little Leaf" affected trees usually begin to show six to eight months from the time they are placed.

Device Sprays 2,500 Sheep an Hour

Condensed from The Oregon Farmer

Cecil Hagen
Staff Member

With an ingenious automatic sprayer designed by Dr. W. E. Shull, Idaho experiment station entomologist who a year ago pioneered in spraying sheep for ticks with DDT, range bands have been treated this spring at the rate of 1200 to 2500 head per hour. Sheepmen who have watched it in operation report that it is as simple and effective a piece of equipment as they have ever seen. The low cost also appeals to them, less than 2 cents per head for DDT.

All there is to it is an inverted "U" made of three-quarter-inch pipe, with spray nozzles attached at the top and sides. It replaces the hand nozzle or nozzles of a power livestock sprayer, and is mounted on angle-iron stakes inside of a narrow paneled chute 60 to 70 feet long. Sheep driven through the chute in single file have no choice but to go through the spray pattern.

Pressure of 400 pounds per square inch (and less than that will not do the job, says Dr. Shull) drives the DDT spray through an unshorn fleece to the animal's skin. Protected from the sun deep in the wool, the DDT retains it toxicity a month or more. This has proved long enough to kill the new crop of sheep ticks that emerge from pupa already laid, and long enough to get most of the wood ticks that the sheep pick up when turned out on the spring range. In bad wood tick areas, a second spraying might be necessary.

This writer reported a year ago the results of Dr. Shull's first sheep spraying experiment, 540 head of ewes in a range band owned by H. M. Hagen of White Bird, Idaho. Mr. Hagen characterized the results as "almost a miracle." No live sheep or wood ticks were found on the ewes a month after they were sprayed. At shearing time, a little later, the sprayed ewes were perfectly clean, and without blood spots in their wool.

To spray those sheep Dr. Shull used a chute wide enough for two sheep abreast. With a hand nozzle held directly against the wool, each animal got a wavy line of spray on its back from head to tail, and a quick pass

Reprinted by permission from the Oregon Farmer, June 5, 1946, Portland, Oregon

around each ear. About two quarts of spray were applied to each animal. Spraying 200 head an hour by this method was about as much as an operator could do.

Late last season Dr. Shull found out that this method was not getting some of the ticks that moved to the underside of the sheep with the arrival of warm weather. Spray applied along an animal's back ran down its sides, but it became apparent that more was needed on the shaded underside.

It was to remedy this objection, as well as to speed up the entire spraying procedure, that Dr. Shull designed his automatic sprayer. The bottom nozzle on each side points upward at a 45-degree angle, directly at the belly of an animal passing through.

This particular "U," or "boom," as Dr. Shull prefers to call it, has 13 nozzles and capped nipples for two more on each side. The number and position of the nozzles can be arranged as desired. How many can be used depends on the size or capacity of the power sprayer available. Dr. Shull says that a sprayer with a capacity of four gallons per minute will handle seven nozzles with No. 3 discs; a seven gallon pump will handle 10 to 11 nozzles with the same discs; and a 10-gallon pump about 14 nozzles.

A handy part of the the equipment is the quick cutoff valve, so rigged with a rope and two pulleys that it can be operated by remote control. Another essential detail, is a cleated board runway extending five or six feet either side of the spray. Without it the ground would soon become muddy. A small ditch usually is dug under the runway to carry waste spray away from the chute. The actual loss of liquid from a spraying by this method is less than with hand spraying.

In some instances, when sheep try to jump over the spray pattern, a canvas cover is thrown over the chute. Sheep coming through then can see a small opening at the bottom of the spray pattern. They try to get under it, thereby getting soaked to the skin.

"This chute set-up works very well where sheep are accustomed to being handled with dogs and other sounds," says Dr. Shull. "Two weeks ago we actually sprayed range sheep at the rate of 2500 per hour. Up to that demonstration, around 1500 head an hour was about as fast as we had put them through.

"Such speeds are not possible, however, with farm flocks. Where sheep have not been handled very much, as is the case in many small farm flocks, it is difficult to get them through the spray pattern." Dr. Shull might have added that the same would be true of dipping.

The spray Dr. Shull recommends for sheep is eight pounds of 50 per cent strength wettable DDT powder per 100 gallons of water. This is a ½ of 1 per cent concentration, by weight of actual DDT, and is double the strength he recommends for hand application.

With the hand method, he had been applying about two quarts of spray per animal. The automatic sprayer puts on just about half that much, so Dr. Shull doubled the spray concentration. The end result or amount of DDT left on each animal is the same, and with DDT it is the amount left on an animal or a surface that counts.

To clear up any misunderstandings about Dr. Shull's revised recommendations for automatic spraying of sheep, here they are in a nutshell: Eight pounds of 50 per cent wettable DDT powder per 100 gallons of water, one quart of this spray to be applied to each animal at a pressure of 400 pounds (not less) per square inch, using nozzles with No. 3 disks.

This spring Dr. Shull has sprayed some 20,000 head of sheep with his automatic outfit. He sprayed the Hagen band at White Bird for wood ticks, using a doubled DDT concentration (1 per cent) in an experimental attempt to find out how long the stronger solution would keep the sheep free of these pests from March until July. The entire band had been sprayed last fall for sheep ticks, and this spring he was able to find none of them. Had sheep lice been present they would also have been killed.

The following week Dr. Shull put on a demonstration at Wendover, Nevada, at the invitation of Nevada stockmen, to spray a large band of sheep that summer in Idaho. Everywhere he has gone he has found sheepmen enthusiastic about the ease of controling ticks with DDT, especially with the faster automatic sprayer.

Spraying sheep is still so new that experimental results on the benefits to be derived are not yet available. They should be about the same as for dipping, without the disadvantages entailed in dipping, such as greater bother and expense and disowning of lambs. It has been shown that simply by dipping ewes and lambs for sheep ticks in the spring, lambs can be marketed 8 to 10 pounds heavier.

Wood tick damage to sheep, and it is heavy, even worse than by sheep ticks in some areas of the west, had been ignored until Dr. Shull successfully used DDT against these pests last year.

Corncobs Do New Job Well

Condensed from Florida Grower

EARLY in the war the navy sent an SOS to the United States department of agriculture. Could it name any inexpensive, nonfood, soft-grit, blasting material, obtainable in large volume, that would remove heavy carbon and oil deposits from the cylinders and pistons of aircraft engines?

The army, it seemed had tried using wheat. Also without success it had tried hominy grits, clover seed, and similar foods and feeds. And cellulose-acetate pellets would not do because they cost too much.

The Bureau of Agricultural Chemistry thought it knew two materials which, after a period of technological research, might turn out to be just what the Navy needed — and which might develop a market for farm waste materials as well. The two products were rice hulls and corncobs.

Experiments showed that the cobs and hulls were entirely satisfactory not only for cleaning engine parts but also for numerous other uses in metal cleaning and fabricating. Moreover, they fitted three other requirements — availability, suitable first cost, and suitable period of usefulness. The navy's Bureau of Aeronautics adopted them as standard.

The soft-grit blasting process has made it possible to clean from four to ten times as many parts as by the older methods, with appreciable savings in man-hours. Older methods of scraping, turning on lathes, and sandblasting damaged many pistons and parts and made them unfit for use. The soft-grit process calls for degreasing the pistons, cylinders or other parts, then cleaning them in a blasting cabinet using grit under air pressure of 80 to 90 pounds per square inch. Dust and dirt are blown into a collector, and the grits are recirculated until they work out.

Under navy specifications, corncobs are ground to pass a 10-mesh screen and be retained by a 32-mesh screen (Tyler screen series), with no chaff or pitch particles and with not more than 13 per cent moisture present in the cobs. Hybrid seed-corn operations produce the most suitable corncobs for this purpose because they are dried during preparation.

The ground corncobs clean airplane cylinders and pistons without changing their dimensions and without pitting the parts.

Reprinted by permission from the Florida Grower, May, 1946, Tampa, Florida

An additional feature of the process is that although the particles used may shrink about 50 per cent in volume, they are free from dirt and still capable of doing good work.

Rice hulls may be used with no grinding or cracking before use, because the blasting process breaks them down sufficiently. An 18 per cent silica content makes them slightly abrasive to steel. Rice hulls do not last as long as cob grit. Experimentation showed that a mixture of 60 per cent corncob grit and 40 per cent rice hulls would flow easily through the air gun and clean more rapidly than corncobs alone.

The soft-grit blasting process has been found satisfactory for cleaning automotive, air-compressor, and other machine parts and for removing paint and other finishes from metal surfaces. The process effectively cleans engine blocks encrusted in one-fourth to one-half inch grease, carbon, oil, and dirt. Machine parts that have collected much grease and oil should be cleaned by wiping, or with solvents, before blasting.

The soft-grit method leaves crankshaft bearing surfaces clean and unpitted. The corncob-rice-hull combination is very successful on cast-iron engine heads. Spark plugs come clean after a soft-grit treatment, yet there is no widening of the gap between the electrodes with consequent need to reset the points. A 5-minute blasting of the corncob-rice-hull mixture against air compressor parts caked with carbon and dirt will remove heavy encrustations from the small holes and threads.

The process effectively blasts scale and rust. It will not, however, entirely remove scale formed in the hardening of steel, that acts as an integral part of the metal. From metal surfaces soft grit easily removes paint, varnish, and lacquer — even if the products have synthetic bases. It will remove rust and welding scale —but did not dislodge hard scale from drawn-steel wire in an experiment to eliminate the pickling step before coating the wire with zinc. Here again, the hard scale acted as an integral part of the metal surface. Soft-grit blasting is not recommended for the removal of paint and varnish from wood surfaces since it tends to gouge out the wood. It is not suitable for removing mill scale and baked enamel, for smoothing castings, or for other operations on metals requiring high abrasive or cutting action. The process is not effective for polishing hard metals or for burnishing.

The news is getting around that soft-grit blasting does a good job. In large industrial establishments the process can be used in standard blasting equipment without alteration. Metal using industries

will find it practicable. Installation of simple booths and equipment would make soft-grit blasting a good business for a great many shops that repair automobiles, farm machinery and other machinery. Low-cost equipment including booths, air-compressors, air guns and dust collectors or cyclones is needed to bring soft-grit blasting within the reach of smaller concerns. Development of the process could open an annual market for thousands of tons of rice hulls and corncobs.

Grass Spray

The horticulture and botany departments at Michigan State College are, at the present time, developing a spray that promises to do three jobs at once. Experiments show that this new farmer's and lawn-grower's dream will kill weeds, fertilize grass or small grain, and protect the grain or grass from attack by fungous disease. The spray combines a solution of the highly selective weed killer 2,4-D with the fertilizer urea (which contains nitrogen) and the well-known fungicide, Fermate.

This economical spray combination resulted from experiments undertaken to overcome the drawbacks to the use of 2,4-D. It was found that 2,4-D, which proved so effective against many broad-leaved weeds while doing no permanent injury to the grasses, does have a tendency to slow up the growth of grasses for a time. So, to overcome this setback, college experimenters hit upon the idea of making the grass grow faster by adding grass fertilizer to the weed-killing spray. Then they experimented with the addition of the fungicide to see if *it* would make the mixture bad for the grass.

It is reported that the weed killer is no worse for the grass when used along with the fertilizer and fungicide than when used alone. And it is just as effective on the weeds. In the experiments, one spraying killed the weeds, and in a few days made the grass a strong, green color, plus boosting the growth.

—*Successful Farming*

Desolation Not For Sale

Condensed from Wisconsin Agriculturist and Farmer

THE returned soldier, and the defense worker, will both have assurance that if they buy farms in 25 central and northern counties in Wisconsin they will have a good chance of making a successful living from the land.

They will not be sold land which is too stony, too swampy, too sandy or too hilly for profitable agricultural use. They need not fear they will loose the money they earned by blood and sweat on grudging land that will not yield, nor will they stagger hopelessly throughout a lifetime under a burden of debt impossible to pay.

Because 25 central and northern counties have zoned their lands, prospective buyers are given special protection. These counties have restricted 5,000,000 acres against agricultural use because these acres are not productive, or because they are too far removed from roads, schools, markets and community centers to make life economically and socially supportable on them.

After World War I, the soldier or defense worker had no such protection. Everyone thought all the land could be turned into farms, and the undeveloped and forested acres of northern Wisconsin looked like real bargains. The well developed farms of the southern part of the state commanded high prices, but in northern Wisconsin a 40 could be purchased for a few dollars. Cheap land in these counties was the lure, and nobody thought that it might be unproductive. All it needed was to be cleared.

Settlers swarmed into the wooded acres and vast numbers went broke, either quickly or by slow and painful degrees. In less than 10 years, an interim committee of the Wisconsin legislature studied growing tax delinquency in northern counties. The committee decided that all land wasn't farm land and concluded that counties should have the right to build up agriculture in areas where that was possible, but that they also should have the right to control that development where areas were without roads and schools and where the soil was unsuitable for farming.

In 1929, the state's zoning law, which allowed townships near Milwaukee to zone against heavy industry starting in suburban communities, was amended so that any county could have the right to regulate, restrict and de-

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termine areas in which agriculture, forestry and recreation could be conducted.

Walter Rowlands of the University of Wisconsin made county zoning his crusade, little realizing that the work he was doing then would result in protecting World War II veterans several years later from buying and settling on lands that could bring them only heartaches.

With a corps of workers, he went through the state, holding meetings, explaining the possibilities and advantages of the law and answering questions. He had maps showing tax delinquent areas, vacant and abandoned farms, farm market outlets and school bus lines. There were also soils maps and maps showing potential and actual recreation lands, as well as areas publicly owned and those which probably would be publicly owned. These maps were to assist local people in determining the lands on which restrictions should be made.

Counties saw the sense in zoning. They liked it because the county board is the authority on enacting zoning, and the town board is the final authority on what land is to be restricted or unrestricted, except in the case of county-owned land. It was democratic, because the people in each communtiy could talk it over and make decisions.

Northern Wisconsin taxpayers saw the sense in zoning too. They learned about the $5,000 road built for one man to transport his own child to school. They discovered a $1,200 road had been built in one county to the home of a settler. The settler used the road just once, to move out his family. In other counties the story was the same. One county gave $1,570 worth of service in one year to a settler who paid $17.50 in taxes. Studies revealed that for every dollar given in county services for schools and snow plowing to isolated settlers, the county was lucky to receive one cent in taxes.

These isolated settlers weren't profitable.

Human Considerations, First

Dollars and cents were important, of course, but most of the success of Mr. Rowland's crusade must be credited to his recognition of the importance of conserving human resources, as well as land resources.

At these town meetings he pictured the plight of the isolated settler, without access to markets, mail, schools, churches, medical services or the companionship of his neighbors. He spoke of the struggles of such a settler, of his work on land that just wouldn't make a living for him, and of his final dispair. The presence of abandoned farms, creating rural slums where all should be beauty, were monuments to personal grief and human loss.

Better Poultry Meat

Condensed from Successful Farming

C. E. Hughes

We're rounding another turn on the road of poultry progress. The day is about gone when a poultry raiser can give all his attention to eggs and forget the meat. During the highly competitive years ahead, it appears that proportionately greater stress will be laid on a more acceptable and tasty carcass. To satisfy a more discriminating consumer, both the poultry raiser and the processor will have to do a better job.

Approximately 65 to 70 percent of the chickens sold by farmers to poultry buyers are Grade A. About 20 to 25 percent run Grade B, and 10 to 12 percent are Grade C.

Poultry buyers would like to see their patrons bring in more Grade A birds and fewer Grade C's. Many Grade B birds could just as well have been Grade A if they had received a little more feed before coming in — or part of the difference might have been due to breeding.

Grade C birds result from poor breeding and indifferent feeding. Then the matters of sanitation and disease also play important roles. Grade B birds bring at least 1½ cents per pound under the price paid for Grade A. Grade C birds bring at least 4 cents per pound under the Grade A figure.

Breeding also has something to do with the grade and price received by the poultry raiser. On the market today are a number of poor crosses which may please the farm flock-owner in many respects, but which are strongly disliked by the processor. These poor crosses may have an inferior shape, skin color, or placement of fleshing. So far, the penalty has not been great, but the day may not be far off when these undesirable crosses (and any other inferior birds for that matter) will be stiffly penalized. And we should remember that headway is being made toward breeding birds for more rapid and complete feathering. Result — few barebacks, bigger checks for the farmer.

To show how this idea of better poultry meat is taking hold, there now is underway a three-year contest for poultry breeders to produce a bird that is superior in fleshing and body conformation — one that will grow faster

Reprinted by permission from Successful Farming, July, 1946, Des Moines, Iowa

on less feed. The contest is called the "Chicken of Tomorrow Program."

In feeding for more economical meat production, body conformation has been neglected. It is reasonable to expect great improvement in plumpness and finish, and this can be said even for Leghorns. We have been selecting deep-bodied, slab-sided birds for egg-laying ability. Now then, why can't we develop the ability to spread out instead of up and down?

We are also in the midst of a revolution in processing of chicken. Already, cut-up poultry is commonly found in the larger cities, and the idea is spreading to smaller population centers.

Eviscerated (all inedible internal organs removed) and quick-frozen birds are in constantly growing demand. Some say that the day of the New York-dressed bird is about over because the housewife loathes the job of cutting up a chicken. Furthermore, this method of dressing doesn't have much eye appeal. But others say the added expense of eviscerated, ready-to-cook birds will be too much for some consumers to pay.

Big things are happening in the realm of poultry meat. It will be a great day for those in the parade of progress, but the outlook is dark for those who ignore the trends.

To Make Money on Race Horses— Raise Them

Condensed from The Ohio Farmer

E. W. McMunn

Rsia during the reign of the Czars and showing pure-ACING trotting horses in Rus-bred Percherons at some of the leading livestock shows in the United States is part of the tradition and history back of the latest venture at Bonnie Brae Farms in Lorain County, Ohio. It is here that William B. Murray and his father, William Murray, have set up one of Ohio's nurseries for producing Standard-bred foals.

Hezekiah, Corlaet, Carthela and other greats of the Percheron world were shown to some of their greatest triumphs by Bill Murray, a farm boy from Lorain County. That was a decade ago. Then, as the heavy horses declined in popularity and demand fell off young Bill and his father bought some mares and started breeding Standardbreds.

They both like the harness race horses. Part of this interest goes back to the days when the senior Mr. Murray was a boy. It was when he was only 18, and shortly before the turn of the century, that he accompanied a shipment of 11 harness horses to Russia and stayed on there for nine years to race as a driver.

All of the Russian race horses at that time were trotters. They raced long races — mostly from two to as many as six miles. Mr. Murray says: "Those Russian drivers were pretty easy to beat when we first went over there. They always had to be ahead. They would drive too fast at the start and so we beat them. But they soon got wise!"

And so it was that Mr. Murray, then a young man of 23 and the youngest man in the race, was able to win the Emperor's Race worth a prize of $30,000. This race was 2¾ miles and for sound trotters only.

Mr. Murray says the Russians of that day dearly loved to win and that they couldn't do enough for a driver as long as he continued to win. After nine years in that country he returned to the United States and to the farm in Lorain County.

With this kind of a background, it is little wonder that the Murrays turned to Standardbreds when they saw interest fall-

Reprinted by permission from The Ohio Farmer, Cleveland, Ohio

ing off the heavy horses. And, just as they went to the top in the Percheron show rings, so too are their Standardbreds making a good name for themselves.

It was in 1940 when Billy Direct 1:55, the world's fastest pacer, entered the stud at Fremont that they bought their first mares. These three mares were bred to the champion stallion and produced three filly foals. The foals were sold privately in 1942 and one of them, Filly Direct, was second in a $10,000 race at Delaware in 1944 and was the second best three-year-old pacing mare in the country that year. They have since been adding brood mares until they now have 10 head.

Since these foals are sold as yearlings the buyers must make their selections largely from the standpoint of conformation and pedigree. With race horses, as with any other kind of livestock, some families and individuals produce much better offspring than others. Bill explains that in buying their brood mares they have tried to get only those from popular lines. Then, they have bred to some of the best stallions of the present day.

For instance, two of the brood mares are sired by Peter the Brewer, two are by Peter Volo and two by Volomite. One mare, Jane Azoff 1:59½, is the fourth fastest pacing mare in the world today. She is a half-sister to Peter Manning 1:56¾, who held the record as the world's fastest trotter until this mark was bettered by the present record-holder, Greyhound, in 1:55¼.

And the colts at this farm have been sired by stallions among the best in the country. Two of the mares have foals by Spencer Scott 1:57¼, the world's champion trotting stallion, one by Billy Direct, the champion pacer, and five are sired by Cardinal Prince 1:58¾. Many of the colts at Bonnie Brae Farms in the past two years have been sired by Cardinal Prince, then under lease by the Murrays. Not only is Cardinal Prince one of the most handsome stallions of the breed, but he also has the distinction of having more winning heats under two minutes than any living stallion. Eight separate times he went two-minute miles to win.

The Murrays board a number of mares, in addition to those they own outright. Some mares are sent here to be bred and remain until after their foals are born. There are now 20 foals on this Lorain County farm and over half of these were born to mares sent there for breeding.

But how does all of this pay off for the Murrays? Well, it has become an important source of farm income. In 1943 their first colts were sold at auction for an average of $555. In 1944 they

averaged $910 and last fall the average was $960. They have another lot of 10 head that will be ready for sale this fall.

These colts are all sold at auction in the fall when they are yearlings. This gives trainers time during the winter to train and break them, getting them ready to race as two-year-olds. Of course, as Mr. Murray points out, there is quite a lot of expense conducted with producing these colts. There is a high service fee if the mare is bred to an outstanding stallion. Then there are nomination fees to be paid if the colts are to be eligible for some of the richest races. Finally, they must be well fed if they are to be large and strong enough to race as two-year-olds.

While these breeders are satisfied with their new business, they do not expect it to become their only source of farm income. In fact, they believe it would be unwise to "carry all their eggs in one basket." Instead, they plan to continue in a general farm program growing the regular field crops and keeping some other livestock. Thus they will not be hurt too much regardless of how prices for racing colts may turn.

Madrid Sweet Clover

Condensed from Soil Conservation

Joe C. Tinney

Work Unit Conservationist with the Soil Conservation Service, Fort Worth, Texas

MADRID sweet clover has become increasingly popular during the past 3 years among farm and ranch cooperators of the Central Colorado Soil Conservation District in the Coleman, Tex., vicinity. It has proved excellent for conservation and improvement of the soil, and serves well as a cash crop and temporary plant.

The Madrid variety of sweet clover is a biennial, yellow-blossom type comparatively new to the Western Gulf region of the Soil Conservation Service. It is leafier, finer stemmed, and has more vigor when young than some of the more common varieties of sweet clover. Current indications are that it contains very little coumarin, an element detrimental to livestock, that is found in some sweet clover.

Farmers who have knowledge of the productiveness of their land over a long period of years report that maximum oat yields have declined from 80 to 100 bushels per acre to 50 or 60 bushels. Cotton lint yields have fallen from half a bale to one-fourth or one-third bale per acre.

Ulmer Brannan, a cooperator in the Buffalo conservation group near Santa Anna, has owned and operated the same land more than 40 years. He says, "My crop yields are only half as large as they were 25 years ago. Although the land has been terraced and planted on the contour for the past 10 years, yield increases have been slight because these practices alone cannot increase soil fertility. The land needs soil improving crops, such as sweet clover, to build it back."

Madrid sweet clover is palatable to livestock. One Coleman farmer reports that his sheep grazed it to the ground before starting on Sudan grass in the same field.

Stock farmers are finding the carrying capacity of Madrid sweet clover superior to that of any other temporary pasture crop they can grow in the Coleman area. It provides from two to four times more grazing for livestock than does common Sudan grass. Raymond McElrath, soil conservation district cooperator

Reprinted by permission from Soil Conservation, June-July, 1946, Washington, D. C.

at Coleman, says that his Madrid sweet clover provided adequate pastures for 63 days during the summer of 1944 for an average of 19 sheep per acre. Again in the fall, 38 sheep per acre were grazed for 3 weeks, making a total of 14 animal months of grazing per acre for the year.

Another cooperator, W. F. Barnes, of Santa Anna, last summer grazed 200 ewes and their lambs on 20 acres of Madrid sweet clover from June through August. That amounts to 10 animal months of grazing per acre.

With proper stocking, it is thought that the grazing period for Madrid sweet clover may be extended from May 15 through December. Such a grazing period would fill a strongly felt need for an adequate forage plant of high nutritious quality to meet the grazing requirements of livestock while permanent pastures are getting needed rest. The crop usually is planted in February and March and is ready to graze by May 15. Growth continues until January when hard freezes usually cause the plant to become dormant. Local growers around Coleman recommend that sufficient acreage be planted each year to satisfy the grazing needs of the farm and that the second-year growth be used only for soil improvement and seed production.

The income of Central Colorado Soil Conservation District cooperators has increased by growing Madrid sweet clover for pasture and soil improvement. Income from sale of seed alone is equal to, or greater than, the proceeds from the usual cash crops. The Madrid seed is harvested with a combine. The crop residue is left on the ground to help improve productivity and soil structure and to help control erosion.

The cost of growing Madrid sweet clover is low. Only 3 to 5 pounds of seed are planted to the acre. Current prices run from 25 to 32 cents per pound. In planting, regular 36- to 42-inch rows are satisfactory. A smooth, firm seed bed is essential. A row-planter, with the covering plows and opening sweeps removed and equipped with plates having five holes of three-sixteenth-inch diameters, has been successful in seeding at the desired rates. A chain or light sandbag dragged behind the planter covers the seed to about one-half-inch depth. A tight seedbox prevents unnecessary loss.

Trial plantings of annual yellow-blossom, common biennial yellow-blossom, Hubam and Madrid sweet clover have been made by cooperators of the Central Colorado District during the past 3 years and they have found the Madrid variety outstanding.

Now You Can "Train" Your Bees

Condensed from Farm Journal

Vernon Vine

IT MAY seem fantastic, but there's a good possibility that farmer-beekeepers soon may be making decisions like these: "I guess I'll have the bees pollinate apple blossoms today and pears tomorrow," or, "I'll send them down to the back 40 on that clover I'm saving for seed."

For bees can be *trained*. This means that we soon may be able to halt the drop in our grass and legume seed production, and that we can pollinate our fruit crops with much more certainty.

It also means that the bee of the future probably will be kept more for pollinating crops than for making honey.

But how do you train bees to work certain crops? Karl von Frisch, a professor at the University of Munich, found the answer several years ago, and our scientists have known the principle ever since von Frisch published his findings. However, it took World War II, which made every pound of seed vitally important to open our eyes to the importance of bees.

You start with sugar syrup (two parts of sugar to one part of water) and some blossoms from the crop you want the bees to work. You can get fair results when you simply dip the blossoms in the syrup, and then put them at the entrance to the hive, or inside it. Or, you can put a pan of syrup inside the hive, surrounded by blossoms. Be careful, though, if nectar is scarce in the fields—other bees may raid your colonies.

Leaving the syrup and blossoms in the hive overnight may be enough; in other cases you may need to keep syrup and fresh flowers as long as the crop you want pollinated is in blossom.

One secret of training bees is to make the syrup sweeter than actual nectar of the blossoms you want the bees to go to. Bees normally will go where the nectar is the sweetest, and if you want them to work on blossoms with low sugar content you've got to fool them. For example, by putting clover blossoms, or clover perfume in the syrup, you make them think that the clover is better than it really is.

Right now, the bee experts are extracting the perfume from blos-

Reprinted by permission from the Farm Journal, July, 1946, Philadelphia, Penna.

soms in the laboratory, and scenting the syrup. That probably will give still better results. So far, there's no practical way for a farmer to extract the perfume. But it seems likely that one day you'll be able to buy "clover perfume," or "sweet attar of turnip blossom." Meanwhile, you can try the syrup method outlined above.

The other day, at the U. S. Department of Agriculture's research center at Beltsville, Md., I talked about this with two of the foremost bee authorities in the world. One was Dr. C. G. Butler, head of the bee department at England's great Rothamsted Experimental Station. The other was James I. Hambleton, chief of bee culture at Beltsville. They tell a fascinating story.

Von Frisch's discovery of how bees "talk" to one another is the thing that makes it possible for us to "harness" bee "power." When a bee has found a good source of nectar, she returns to the hive and goes into a "round dance." That's an exact description of what I saw going on inside the glass-sided observation hive at Beltsville.

The nectar-laden bee begins shuffling in a circle, while the bees near her feel her body to find out what kind of nectar she has brought back. Then they go in search of the same nectar.

If the bee has brought back pollen instead, she goes into an entirely different dance — she moves in a figure-8, stopping frequently to do a "wag-tail" movement.

Training pollen bearers is the next job. Some crops, notably alfalfa, must be pollinated by bees in search of pollen instead of nectar. Bee men see no reason why they can't do it.

The Russians were the first to make practical use of von Frisch's discoveries. The Nazis had not only ignored them, but had thrown von Frisch into a concentration camp as an anti-Nazi.

But when the Nazis marched into Russia and found the Reds putting bees to work—and actually getting increases of as much as 300% in yields of red clover seed—they freed von Frisch and set him up in a small laboratory at Salzburg, Austria.

In this country, Mr. Hambleton declares, we have upset the balance of nature by cutting or burning our forests; by planting vast acreages of single crops (thus starving wild bees, which need blossoms throughout the summer), by cleaning out fence rows and mowing along roads in a "tidiness craze," and by our widespread and wholesale use of insecticides.

Moreover, we have overlooked the fact that bees prefer some flowers to others. Bees naturally will go to the crop, with the

sweetest nectar. Sweet clover, for example, has one of the sweetest nectars; pear nectar is one of the least sweet. So if you want red clover, or alfalfa, or fruit pollinated, be careful what you plant nearby.

Bee keeping is a specialed business. Mr. Hambleton and Dr. Butler both advise you not to get into it unless you're ready to do a good job.

First thing for you, as a crop man, to remember is that there isn't much honey in many of the crops you need to use bees on. Therefore, you should be willing to pay to have the bees on your place, instead of expecting the bee man to pay for the "use" of the fields.

Here are some easy-to-use suggestions for right now: Make it worth while for a bee keeper to come on your farm. Give him a decent place to put his hives. Avoid planting highly attractive crops close to less attractive crops if you want the bees to work the latter. Keep seed crops that cross easily well separated—half a mile apart, at least.

Fighting Prairie Fires

Condenced from The Cattleman

A. E. McClymonds

Regional Conservator Soil Conservation Service

WHEN there is plenty of feed for livestock on the western ranges, there is also plenty of fuel for serious prairie fires. And the carelessness of man, and to some extent lightning, see to it that the fires get started.

As a result, fires this last spring have consumed thousands of acres of grass, large quantities of stacked hay, many fence posts, and some farm and ranch buildings. Damages total thousands of dollars. To some operators, they add up to near financial ruin.

There are several bright spots in this picture, however. One is the Land Utilization Project lands in southeast Pennington county and western Jackson county, South Dakota, which have escaped almost unscathed. Some bad fires were prevented there because the people were organized and equipped. Grass reserves and stacked hay were preserved.

The core of the fire-fighting set-up in that area is a fire truck stationed at Wall. It was supplied through the cooperation of the town of Wall, the Soil Conservation Service and the three cooperative grazing districts concerned. Under the direction of Howard Connally, chief of the Wall volunteer fire department, the truck had made three runs this spring.

One fire started in a farm house 10 miles from Wall. It was put out with little damage. But it could easily have been serious. It started when greasy overalls were being soaked in gasoline in the basement. The farmer battled it for a short time, saw that he could not win, and called the fire department. The fire was quickly controlled after the truck arrived.

In contrast, one fire in neighboring Haakon county also started in a farm house. But it got away. It swept across four other ranches and ended up in a pasture on the fifth ranch. On the way it burned up all the buildings but the house on one of the ranches. Another set of buildings was saved by natural barriers. Tractors with plows were used and the Philip, South Dakota, fire

Reprinted by permission from The Cattleman, July, 1946, Fort Worth, Texas

department went out. These fire-fighters succeeded in holding the fire to a relatively narrow strip but were not equipped to head it off.

Other calls answered by the Wall equipment were to one place where it was used to put out a half-mile of fire, a back fire, and the flames on many burning fence posts. The other call was 20 miles from Wall, but the fire was under control when the truck arrived. Farmers equipped with hand tools had succeeded in preventing its spread.

Again in contrast, one of the Haakon county fires started from a straw stack which the rancher was burning. Available equipment could not keep pace with the flames in that relatively broken terrain and the fire was not brought under control until the following day. It burned over several sections of grazing land on three other ranches, destroying a large quantity of hay and fence.

To the north, the Tri-County soil conservation district reports that three fires proved costly, while Dewey county had one fire that covered 40,000 acres. These are in counties close to Land Utilization projects. They are only a few of the many which have occurred in the western range areas. But the situation in Pennington and Jackson counties is not essentially different from the 14 other places in North and South Dakota, Nebraska and Montana where the Soil Conservation Service has aided in setting up motorized fire control equipment.

The Soil Conservation Service is not being a "big brother" in these activities. It has just as selfish an interest in successful fire control in the Land Utilization Project as the ranchers. The range grasses are what the ranchers depend upon for their incomes through livestock production. The stacked hay is the feed reserve to winter their herds and carry them over dry years. The ranchers must protect their feed resources and the fertility of their lands if they are to survive.

On the other hand, nearly one-fourth of the 20-odd million acres in Land Utilization Projects in the Northern and Great Plains is federally-owned land administered by the Soil Conservation Service. Leasing them to grazing districts supplies the income with which to pay management costs and compensate counties in lieu of taxes. It is essential that these lands be protected from fire. Further, they are generally more acutely in danger of erosion than other lands because they are largely the less desirable, more severely eroded and abandoned lands that were purchased in the mid-1930's. Destruction of the grass cover has its most serious consequences there.

Organization for fire control in the Land Utilization Projects is formal and definite. It brings together all the people and agencies concerned. It provides for whatever preventive measures can be taken, for alarm systems, for immediate attack on a fire by those closest to it to gain control quickly if possible, and for manning and use of the fire trucks. Equipment provided is especially suited for combatting prairie fires.

In Pennington and Jackson counties, the co-operators in addition to the Soil Conservation Service and the town of Wall are the East Pennington, White River and Cane Creek co-operative grazing districts, the Jackson county soil conservation district, and the Badlands National Monument of the National Park Service. Each has a definite part and assumes certain obligations. Among them are the responsibilities for plowing and maintaining a system of fire guards.

Equipment supplied under this agreement includes eight caches of fire tools located at strategic places, and the fire truck stationed at Wall. Five-gallon backpack pump outfits, canvas water bags, metal buckets, long-handled shovels, mattocks, fence pliers, fire swatters and first aid kits are in the caches. On the truck are a 340-gallon tank, motor driven force pump, several nozzles including a fire nozzle, Indian fire pumps, fire extinguishers, hose, ladders, buckets, drag chains, shovels, and fire swatters.

Organization of the ranchers for the first action against fires that may occur centers around the tool caches. Each serves a definite area and is in charge of a fire warden selected from among the ranchers by the grazing district directors. A warden is foreman when the men in his area turn out to fight a fire. The truck at Wall is manned by the volunteer fire department, whose members are subject to call at any time. Employees of the Soil Conservation Service who may be in the area are also, of course, subject to call.

Necessarily the membership in co-operative fire control organizations and available manpower cause certain variations in operations procedures from place to place, but the principle of co-operation does not vary. At Terry, Montana, for instance, more townspeople are available than at Wall. Each business firm places an employee and a car on call. This is enough to man the truck and also to provide transportation to take additional men to the fires. And they can get into operation speedily.

Development of effective co-operation in fire control is continuing in all parts of the Land Utilization Projects in the Northern Great Plains. Every unit has

such an organization, including the tool caches, fire wardens and training of people.

Eventually it is hoped that complete protection will be provided. If the ranchers are to succeed, they must have feed for their livestock. To have that feed, they must graze their lands so as to conserve soil and moisture. Yet, when they do this, a house fire, a burning straw stack, or even a carelessly thrown match may wipe out their feed supplies, their homes, and even their livestock. Successful fire control is one of the musts for successful ranching.

Hogs

Experiments reported this spring by the University of Illinois showed that feeding 10 percent of high-quality alfalfa meal or giving brood sows access to fall-seeded rye pasture during the winter greatly increased the weights and numbers of pigs weaned. Brome grass was practically as good as alfalfa pasture in experiments with fattening pigs. Pigs fed on brome grass required about a week longer to reach market weight and ate 6.5 percent more feed per 100 pounds of gain than those fed on alfalfa pasture.

—*Successful Farming*

An Easy Way To Move Hay

Condensed from American Agriculturist

Marshall Hawes

KENNETH HAWS of Hannibal, N. Y., is a farmer who knows that farming is hard work but gets pleasure in taking the "hard" away from the work. He demonstrated this very successfully during the past winter when it came time to bale the extra forty tons of hay that had been put into the mow the preceding summer.

In the past it had required a crew of eight men to get the hay to the press and to pile the bales as they came away from the machine. Unable to find adequate labor, Mr. Haws turned his attention to the possibilities of the electric hay hoist. Using the ingenuity common to farmers, he and his hired man, reduced men required from 8 to 5 as well as the back-breaking labor involved.

The hoist is the double drum type. It had been purchased in 1944 and was used then and during the past year for unloading hay. The large drum was used for the actual unloading, and the little drum was used to some extent to pull the car back.

The hoist is powered by a 5 H. P. electric motor, providing a combination that is capable of adequately handling half - ton loads. A 3 H. P. motor was tried and found to be lacking when unusually large loads were put on it, in spite of the fact that a 5-inch pulley on the motor and a 28-inch pulley on the hoist gave a high power ratio.

The large drum was being used for pulling hay out of the mow to be used in feeding the cows, and it was not difficult to adapt the arrangement so that hay from the farthest reaches of the barn could be dropped very close to the press.

Two men then picked the hay apart and passed it on to the man feeding the press. One man, setting the fork and operating the hoist, was able to keep these men busy. However, all of the men agreed that it was easier to move the hay to the press after it had been pulled loose from the mow than to have to pull the hay out by hand.

When it came to piling the bales, the little drum was used. It was equipped with 150 feet of half-inch rope. Ice tongs were available to try for grapples and,

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fortunately, they worked excellently from the start. It was first attempted to fasten the tongs directly to the end of the rope. This failed, since there was a good deal of swing to the bales on the end of the rope. Also, it was practically impossible to carry the bales to the desired place on the mow.

Eventually, the tongs were suspended from a chain which, in turn, was strung through the ring of a pulley block. The rope was then run through the pulley and fastened to a girt in the barn. By changing the position of the rope from girt to girt, it was possible to place bales almost anywhere in the mow. The man in the mow had only to move the bales into position.

When the truckers came to get hay, changing the position of the rope made it possible to load the trucks in the same way. The truckmen were very enthusiastic about it.

Animal d-Ter — New Insect Repellent

ALREADY a proven boon to household and vacation users, "d-Ter," the Navy-developed insect repellent marketed only two months ago, now provides freedom from insects for livestock, pets, plants and crops, in the form of a new spray-on product.

Called "Animal d-Ter," it contains a 15% solution of the original, concentrated repellent which U. S. Naval chemists perfected as a Repellent Formula 448 after 3½ years experiment. Besides being utilized now in quantity by boards of health and insect control commissions of the larger cities and towns, "d-Ter" has been made available to farm bureaus, grange and co-operative associations of rural communities. Already reports from farms and dairies of the United States and Canada indicate it meets with like success to that which followed tests of 448 in tropical combat zones during the war, and the public introduction of the commercial "d-Ter," both in the original apply-by-hand and the later household spray-on varieties.

Merchandised by Chandler Chemical Corporation of New York, "Animal d-Ter," comes in an orange-tinted, 8-ounce bottle complete with spray attachment. It is effective in keeping pest insects of all varieties away from dogs, cats, poultry, pigeons and pet stock, and horses, sheep, cows and other livestock. To keep farm animals insect-free an application by spraying is necessary but once every two weeks.

"Household d-Ter," too, can be sprayed around farms, in dairies and barns and on walls, clothing, and objects of farm use. A cloth moistened with the substance can be rubbed on kitchen and picnic tables and on counters in restaurants or out of doors to repel all types of flying insects.

Either of the two spray forms can be used on plants and crops in gardens or fields without ill effect.

Applied to exposed skin areas, only a few drops of the original "d-Ter," which comes in a small pocket-flask bottle, are needed for pest-free vacation junkets, picnics, and camping, hunting, fishing, swimming, or working in the fields.

All "d-Ter" solutions are non-toxic and do not stain or harm clothing or cosmetics. The repellent protects against all types of flies, mosquitoes, fleas, chiggers, ticks and red bugs for as long as 36 hours under temperature conditions.

FOR THE FARMER'S LIBRARY

These books are recommended as outstanding in their field:

A Living from Bees—By Frank C. Pellett, Field Editor of American Bee Journal. Orange Judd Publishing Co., Inc. $2.25.

America's Garden Book—By Louise Bush-Brown and James Bush-Brown. Charles Scribner's Sons. $3.50.

An Agricultural Testament—By Sir Albert Howard, C.I.E., M.A., former Director, Institute of Plant Industry, Indore. Oxford Univ. Press. $3.50.

Animal Sanitation and Disease Control—By Dr. R. R. Dykstra, Dean, School of Veterinary Medicine, Kansas State College. The Interstate Printers and Publishers. $3.50.

Beef Cattle Production in the South—By D. W. Williams, Head, Department of Animal Husbandry, A. & M. College of Texas, College Station, Texas. The Interstate Printers & Publishers. $2.50.

Breeds of Livestock in America—By Henry W. Vaughan, formerly Prof. of Animal Husbandry, Iowa State College. College Book Co. $4.75.

Dairy Cattle Feeding and Management—3rd Edition—By H. O. Henderson, Prof. of Dairy Husbandry, W. Va. Univ., Carl W. Larson and Fred S. Putney. John Wiley & Sons, Inc. $4.50.

Dairy Science—By W. E. Petersen, Ph.D., Assoc. Prof. Dairy Husbandry, Univ. of Minn. By R. W. Gregory. J. B. Lippincott Co. $4.00.

Diseases and Parasites of Poultry — By Edgar Hugh Barger, D. V. M., Berkeley, Calif., and L. E. Card, Ph.D., Prof. of Poultry Husbandry, Univ. of Illinois. Lea & Febiger. 3rd Edition. $3.75.

Farmers of the World—The Development of Agri. Extension—edited by Edmund deS. Brunner, I. T. Sanders, Douglas Ensminger. Columbia Univ. Press (1945). $2.50.

Farm Management—By Robert R. Hudelson. The Macmillan Co. $2.50.

Farm Management and Marketing—By V. B. Hart, M. C. Bond, L. C. Cunningham, all of N. Y. State College of Agriculture, Cornell University. John Wiley & Sons, Inc. $2.90.

Farm Records—by John A. Hopkins, Ph.D., Asso. Prof. Economics, Iowa State College. Iowa State College Press. $3.00.

Feeds and Feeding—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $5.00.
Available October 15

Forestry in Farm Management—By R. H. Westveld and Ralph H. Peck. John Wiley & Sons, Inc. $3.00.

Grow Your Own Fruit—By M. G. Kains, formerly U. S. Dept. of Agri.; Prof. of Horticulture, Penna. State College. Greenberg, Publisher. $3.50.

Growing Tree and Small Fruits—By H. B. Knapp, Director, State Institute of Applied Agri., Farmingdale, L. I., N. Y., and E. C. Auchter, Chief, Bureau Plant Industry, U. S. D. A. John Wiley & Sons. $2.75.

How to Raise Rabbits for Food and Fur—By Frank G. Ashbrook, Fish and Wildlife Service, U. S. Dept. of the Interior. Orange Judd Publishing Co., Inc. $2.00.

Judging Dairy Cattle—By Edwin S. Harrison, Professor of Animal Husbandry, Cornell University. John Wiley and Sons, Inc. $2.75.

Livestock Production—By Walter H. Peters, Chief, Div. of Animal and Poultry Husbandry, Univ. of Minn. McGraw-Hill Book Co., Inc. $4.00.

Livestock Judging Handbook — By Julius E. Norby and W. Malcolm Beeson, Ph.D., Asst. Professors Animal Husb., Univ. Idaho. The interstate Printers. $3.25.

Modern Agricultural Mathematics—By Maurice Nadler, B. S., A. M., Dept. of Mathematics, Newtown High School, Long Island. Orange Judd Publishing Co., Inc. $2.00.

Modern Farmers' Cyclopedia of Agriculture—By Earley Vernon Wilcox, Ph.D., formerly U. S. Dept. of Agri. Orange Judd Pub. Co., Inc. $4.50.

Natural Principles of Land Use—By Edw. H. Graham, Chief of Biology Div., Soil Conservation Service. Oxford University Press. $3.50.

Pay Dirt—Farming and Gardening with Composts — By J. I. Rodale. Devin-Adair Co. (1945). $3.00.

Pleasant Valley — By Louis Bromfield, author, farmer, soil conservationist. Harper and Brothers. $3.00.

Pork Production — By William W. Smith, Prof. of Animal Husbandry, Purdue Univ. The Macmillan Co. $3.75.

Poultry—By A. R. Winter, Asst. Prof. Poultry Husbandry, Ohio State Univ., and E. M. Funk, Asst. Prof. Poultry Husbandry. Mo. State Univ. J. B. Lippincott Co. $5.00.

Practical Farming for the South — By Benjamin F. Bullock, now Prof. Rural Education, Atlanta Univ. Univ. of North Carolina Press. $2.50.

Profitable Poultry Keeping—By H. Clyde Knandel, Head, Dept. Poultry Husb., Penn State College. Orange Judd Publishing Co., Inc. $3.00.

Repairing Farm Machinery—By Ivan G. Morrison, Asst. Professor Agri. Education, Purdue Univ. The Interstate Printers & Publishers. $2.25.

Seaman A. Knapp—Schoolmaster of American Agriculture—By Joseph C. Bailey, Dept. History and Social Science, Hunter College. Columbia University Press. 1945. $3.25.

Sheep Production—By Levi Jackson Horlacher, B.S.A., M.A., Asst. to Dean, Col. Ag. Univ. Ky. McGraw-Hill Book Co., Inc. $4.50.

Soil Conservation—By Hugh Hammond Bennett, Chief, Soil Conservation Service, U. S. Dept. of Agric. McGraw-Hill Book Co., Inc. $6.50.

Successful Poultry Management—By Morley A. Jull, Professor and Head of Poultry Dept., Univ. of Maryland. McGraw-Hill Book Co., Inc. $3.50.

Success on the Small Farm—by Haydn S. Pearson, author. McGraw-Hill Book Company. $2.50.

The American Land — Its History and Its Uses — By William R. Van Dersal, biologist in the U. S. D. A. Oxford University Press. $3.75.

The Farm Primer—By Walter Magnes Teller, formerly with the Farm Security Administration, U. S. D. A. David McKay Co. $2.50.

For the convenience of our readers, books listed may be purchased through this Department. Address Farmers Digest, Ambler, Pa.

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UNIVERSAL

There is a maxim universally agreed upon in Agriculture, that nothing must be done too late; and again, that everything must be done at its proper season; while there is a third precept which reminds us that opportunities lost can never be regained.

—PLINY THE ELDER

Land Policy Review